REPORT OF
AIR POLLUTION SOURCE TESTING
OF AN ETHYLENE OXIDE EMISSION-CONTROL SYSTEM
OPERATED BY STERIGENICS U.S., LLC.
IN SANTA TERESA, NEW MEXICO
ON NOVEMBER 15, 2016

Submitted to:

NEW MEXICO ENVIRONMENT DEPARTMENT
Air Quality Bureau
1301 Siler Road, Building B
Santa Fe, New Mexico 87507

Submitted by:

STERIGENICS U.S., LLC.
2400 Airport Road
Santa Teresa, New Mexico 88008

NSR Permit No. 0733-M15

Prepared by:

ECSi
PO Box 848
San Clemente, California 92674-0848

Prepared on:

December 20, 2016

ECSi

CONTACT SUMMARY

CLIENT

Ms. Laura Hartman
Environmental Health and Safety
STERIGENICS U.S., LLC.
2015 Spring Road, Suite 650
Oak Brook, Illinois 60523

Phone: (630)928-1724
email: LHartman@sterigenics.com

FACILITY

Mr. Steve Ortiz
General Manager
STERIGENICS U.S., LLC.
2400 Airport Road
Santa Teresa, New Mexico 88008

Phone: (575)589-9300
email: SOrtiz@sterigenics.com

TEST DATE

November 15, 2016

REGULATORY AGENCY

NEW MEXICO ENVIRONMENT DEPARTMENT
Air Quality Bureau
1301 Siler Road, Building B
Santa Fe, New Mexico 87507

Phone: (505)476-4300
FAX: (505)476-4375
email: Stacktest.aqb@state.nm.us

TESTING CONTRACTOR

Daniel P. Kremer
Project Manager
ECSi, Inc.
PO Box 848
San Clemente, California 92674-0848

Phone: (949)400-9145
FAX: (949)281-2169
email: dankremer@ecsi1.com

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1.0 INTRODUCTION

On Tuesday, November 18, 2015, ECSi performed air pollution source testing of an ethylene oxide (EtO) emission-control system operated by Sterigenics U.S., LLC. in Santa Teresa, New Mexico. The control device tested was a Donaldson Abator catalytic oxidizer, which is currently used to control emissions from two aeration rooms and thirteen sterilization chamber backvents. The purpose of the testing program was to evaluate continued compliance with EPA requirements under the current National Emissions Standards for Hazardous Air Pollutants (NESHAP), Subpart O - Ethylene Oxide Sterilization Facilities, and with requirements in the facility's NSR Permit No. 0733-M15 issued by the New Mexico Environment Department (NMED).

2.0 EQUIPMENT

The EtO gas-sterilization system is comprised of thirteen commercial sterilizers, all discharging through dry screw or liquid-ring vacuum pumps to a packed-tower Ceilcote acid scrubber emission control device. Two aeration rooms and thirteen sterilization chamber backvents are all discharged to a Donaldson Abator catalytic oxidizer emission-control device. The gas-sterilization and emission-control equipment consists of the following:

- Thirteen Gas Sterilizers, each comprised of a steam-heated sterilization chamber (varying in size from 13-30 pallet capacity), a dry screw or liquid ring recirculating vacuum pump chamber evacuation system ("chamber vacuum vent"), and a backdraft valve ("chamber backvent");

- Two aeration rooms and three aeration cells, each comprised of a heated aeration chamber and a chamber exhaust system.

Sterilizer vacuum pump emissions are controlled by:

- One packed-tower Ceilcote chemical scrubber, equipped with a packed reaction/interface column, a scrubber fluid recirculation system, a scrubber fluid reaction/storage tank, and a dedicated blower exhaust system.

Aeration room and sterilizer backvent emissions are controlled by:

- One Donaldson EtO Abator catalytic oxidizer, 20,000 SCFM, equipped with a prefilter, a gas-fired heater, an exhaust gas heat exchanger, a reactive catalyst bed, and an exhaust blower.

3.0 TESTING

EtO source testing was conducted in accordance with the procedures outlined in USEPA CFR40, Part 63.365(d)(2). EtO concentration measurement for each test run was conducted simultaneously at the inlet and outlet of the catalytic oxidizer during a one-hour interval of the 24-hour aeration process, and during the 15-minute sterilizer backvent duration. A total of three one-hour aeration test runs and one 15-minute backvent test run were performed.

During aeration and backvent testing, EtO concentration at the inlet and the outlet of the catalytic oxidizer was determined using direct source sample injection into the gas chromatograph (GC). All aeration and backvent testing was performed using recently sterilized product. The testing program was conducted in accordance with the procedures outlined in the following sections.

4.0 RULE/COMPLIANCE REQUIREMENTS

The facility's Donaldson Abator catalytic oxidizer system was tested to determine compliance with the current federal EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) in 40 CFR Part 63, Subpart O and the facility's NSR permit. Applicable provisions in the NESHAP standard include Sections 63.362(d) and 63.363(b)(4)(i). Specifically, the current testing was performed to demonstrate continued compliance with the following requirements:

- The emissions from the aeration process must be discharged to control equipment with an EtO emission-reduction efficiency of at least 99.0% by weight. {Section 63.362(d)}

- The emissions from the sterilizer backvents must be discharged to control equipment with an EtO emission-reduction efficiency of at least 99.0%. {NSR Permit Section A803 A.}

Testing is required to demonstrate compliance with these requirements. Source testing of the emission-control device is required annually, in accordance with Federal EPA and NMED requirements.

5.0 TEST METHOD REFERENCE

5.1 INTRODUCTION

EtO source testing was conducted in accordance with the procedures outlined in USEPA CFR40, Part 63.365(d)(2), using EPA Method 18 as specified in 40CFR, Part 60, Appendix A. EtO concentration measurement for each test run was conducted simultaneously at the inlet and outlet of the catalytic oxidizer during a one-hour interval of the 24-hour aeration process, and during the 15-minute sterilizer backvent duration. A total of three one-hour aeration test runs and one 15-minute backvent test run were performed.

During aeration and backvent testing, EtO concentration at the inlet and the outlet of the catalytic oxidizer was determined using direct source sample injection into the gas chromatograph (GC). All aeration and backvent testing was performed using recently sterilized product.

Operation and documentation of process conditions were performed by personnel from Sterigenics using existing monitoring instruments installed by the manufacturer on the equipment to be tested. In accordance with the procedures established in USEPA CFR40, Part 63, Subpart O, Section 63.363(b)(3), the following parameter was recorded: catalyst bed operating temperature. Process condition data is recorded in Tables 1 and 2.

5.2 ETO CONTROL EFFICIENCY MEASUREMENT

During aeration and backvent testing, EtO concentration at the inlet and outlet of the catalytic oxidizer was determined using direct source sample injection into the GC. Since the source gas flow is identical at the inlet and outlet of the catalytic oxidizer control-efficiency of EtO during aeration and backvent was calculated by comparing the concentration of EtO vented to the system inlet to the concentration of EtO vented from the system outlet.

During backvent and aeration testing, vented gas was analyzed by an SRI, Model 8610, portable gas chromatograph (GC), equipped with the following: dual, heated sample loops and injectors; dual columns; and dual detectors. A flame ionization detector (FID) was used to quantify inlet EtO concentration, and a photoionization detector (PID) was used to quantify low-level EtO concentration at the emission-control device outlet.

5.3 SAMPLE TRANSPORT

Source gas was pumped to the GC at approximately 1000 cubic centimeters per minute (cc/min) from the sampling ports through two lengths of Teflon® sample line, each with a nominal volume of approximately 75 cubic centimeters (cc) and an outer diameter of 0.25 inch. At the inlet, the sampling port was located in the aeration discharge duct, upstream of the oxidizer. At the outlet of the catalytic oxidizer, sampling ports were located in the exhaust stack downstream of the catalyst bed.

5.4 GC INJECTION

Source-gas samples were then injected into the GC which was equipped with two heated sampling loops, each containing a volume of approximately 2cc and maintained at 100 degrees Celsius (C). Injections occurred at approximately one-minute intervals during backvent testing, and at approximately five-minute intervals during aeration testing. Helium was the carrier gas for both the FID and PID.

5.5 GC CONDITIONS

The packed columns for the GC were both operated at 80 degrees C. The columns were stainless steel, 6 feet long, 0.125 inch outer diameter, packed with 1 percent SP-1000 on 60/80 mesh Carbopack B.
During the analysis, the FID was operated at 250 degrees C. The support gases for the FID were helium (99.999% pure), hydrogen (99.995% pure) and air (99.9999% pure). Any unused sample gas was vented from the GC system back to the inlet of the control device being tested.

5.6 CALIBRATION STANDARDS

The FID was calibrated for mid-range part-per-million-by-volume (ppmv) level analysis using gas proportions similar to the following:

1) 100 ppmv EtO, balance nitrogen
2) 50 ppmv EtO, balance nitrogen (audit gas)
3) 10 ppmv EtO, balance nitrogen
4) 1 ppmv EtO, balance nitrogen

The PID was calibrated for low-range ppmv level analyses using gas proportions similar to the following:

1) 100 ppmv EtO, balance nitrogen
2) 50 ppmv EtO, balance nitrogen (audit gas)
3) 10 ppmv EtO, balance nitrogen
4) 1 ppmv EtO, balance nitrogen

Each of these calibration standards was in a separate, certified manufacturer's cylinder. Copies of the calibration gas laboratory certificates are attached as Appendix G.

5.7 SAMPLING DURATION

Backvent testing consisted of a one 15-minute test run, which encompassed the entire duration of a single cycle of the backvent process. Since aeration is a 24-hour process at this facility, with constant discharge flow from the aeration chambers to the Donaldson Abator emission-control system, aeration testing consisted of three (3), 1-hour test runs. Each test run was performed with freshly sterilized product in the sterilization chambers and/or aeration rooms.

5.8 CONTROL-EFFICIENCY CALCULATIONS

Control efficiency of EtO was calculated for backvent and aeration. Results of the control-efficiency testing are presented in Section 8.0, and in Tables 1 and 2.

6.0 TEST SCENARIO

Backvent and aeration testing was performed during normal process load conditions. One backvent test run and three aeration test runs were conducted in series to verify the performance of the emission-control device. The testing schedule was as follows:

1) Testing equipment was set up and calibrated.
2) Backvent Test Run #1 was conducted with freshly sterilized product in sterilization chamber. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
3) Aeration Test Run #1 was conducted with freshly sterilized product in aeration. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
4) Aeration Test Run #2 was conducted with freshly sterilized product in aeration. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
5) Aeration Test Run #3 was conducted with freshly sterilized product in aeration. Sampling was performed at the inlet and the outlet of the catalytic oxidizer.
6) Post calibration check was performed, testing equipment was packed.

7.0 QA/QC

7.1 FIELD TESTING QUALITY ASSURANCE

At the beginning of the test, the sampling system was leak checked at a vacuum of 15 inches of mercury. The sampling system was considered leak free when the flow indicated by the rotameters fell to zero.

At the beginning of the test, a system blank was analyzed to ensure that the sampling system was free of EtO. Ambient air was introduced at the end of the heated sampling line and drawn through the sampling system line to the GC for analysis. The resulting chromatogram also provided a background level for non-EtO components (i.e. ambient air, carbon dioxide, water vapor) which are present in the source gas stream due to the ambient dilution air which is drawn into the emission-control device, and due to the destruction of EtO by the emission-control device which produces carbon dioxide and water vapor. This chromatogram, designated AMB, is included with the calibration data in Appendix A.

7.2 CALIBRATION PROCEDURES

The GC system was calibrated at the beginning and conclusion of each day's testing. Using the Peaksimple II analytical software, a point-to-point calibration curve was constructed for each detector. A gas cylinder of similar composition as the calibration gases, but certified by a separate supplier, was used to verify calibration gas composition and GC performance.

All calibration gases and support gases used were of the highest purity and quality available. A copy of the laboratory certification for each calibration gas is attached as Appendix G.

8.0 TEST RESULTS

The catalytic oxidizer was found to have an average EtO control efficiency of 99.95% for the backvent process, and 99.98% for the aeration process. During backvent and aeration testing the catalytic oxidizer was operated at 281 degrees F (i.e., bed outlet temperature). In accordance with state and federal requirements, backvent and aeration discharge streams must be vented to control equipment with an EtO emission-reduction efficiency of at least 99 percent by weight. The facility's Donaldson Abator catalytic oxidizer met this requirement.

The test results are summarized in Tables 1 and 2. These tables include results for EtO control efficiency of the emission-control device for backvent and aeration. Chromatograms and chromatographic supporting data are attached as Appendices A through E. Copies of field data and calculation worksheets are attached as Appendix F.

TABLES

TABLE 1
ETHYLENE OXIDE CONTROL EFFICIENCY - BACKVENT
OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE
OPERATED BY STERIGENICS U.S., LLC.
IN SANTA TERESA, NEW MEXICO
ON NOVEMBER 15, 2016

CYCLE PHASE	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
Backvent(3)	934	50.2	0.01	99.9801
Backvent	935	272	1.31	99.5184
Backvent	936	99.7	0.01	99.9900
Backvent	937	81.6	0.01	99.9877
Backvent	939	77.1	0.01	99.9870
Backvent	940	77.3	0.01	99.9871
Backvent	941	82.5	0.01	99.9879
Backvent	942	76.6	0.01	99.9869
Backvent	943	76.7	0.01	99.9870
Backvent	944	76.2	0.01	99.9869
Backvent	945	75.5	0.01	99.9868
Backvent	947	74.7	0.01	99.9866
Backvent	948	73.9	0.01	99.9865
TIME-WEIGHTED AVERAGE:		**91.8**	**0.1100**	**99.9507**
		NMED REQUIRED CONTROL EFFICIENCY:		**99%**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - The backvent phase test run started at 9:33, ended at 9:48.
(4) - The average catalyst bed temperature recorded during the test run was 281 degrees F.

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TABLE 2
ETHYLENE OXIDE CONTROL EFFICIENCY - AERATION
OF AN ETHYLENE OXIDE EMISSION CONTROL DEVICE
OPERATED BY STERIGENICS U.S., LLC.
IN SANTA TERESA, NEW MEXICO
ON NOVEMBER 15, 2016

RUN NUMBER	INJECTION TIME	INLET ETO CONC. (PPM)(1)	OUTLET ETO CONC. (PPM)(2)	ETO CONTROL EFFICIENCY
1(3)	949	74.6	0.01	99.9866
1	954	72.3	0.01	99.9862
1	959	68.3	0.01	99.9854
1	1004	69.5	0.01	99.9856
1	1009	110	0.01	99.9909
1	1014	72.8	0.01	99.9863
1	1019	69.3	0.01	99.9856
1	1024	65.4	0.01	99.9847
1	1029	64.0	0.01	99.9844
1	1034	63.6	0.01	99.9843
1	1039	62.9	0.01	99.9841
1	1044	60.4	0.01	99.9834
2(4)	1049	60.5	0.01	99.9835
2	1054	59.4	0.01	99.9832
2	1059	59.5	0.01	99.9832
2	1104	59.7	0.01	99.9832
2	1109	59.5	0.01	99.9832
2	1114	59.7	0.01	99.9832
2	1119	59.9	0.17	99.7162
2	1124	60.2	0.01	99.9834
2	1129	58.0	0.01	99.9828
2	1134	55.6	0.01	99.9820
2	1139	55.0	0.01	99.9818
2	1144	54.7	0.01	99.9817
3(5)	1149	54.2	0.01	99.9815
3	1154	54.2	0.01	99.9815
3	1159	53.0	0.01	99.9811
3	1204	53.4	0.01	99.9813
3	1209	53.5	0.01	99.9813
3	1214	52.9	0.01	99.9811
3	1219	53.1	0.01	99.9812
3	1224	49.9	0.01	99.9800
3	1229	49.5	0.01	99.9798
3	1234	48.6	0.01	99.9794
3	1239	50.2	0.01	99.9801
3	1244	44.9	0.01	99.9777
TIME-WEIGHTED AVERAGE:		**60.34**	**0.0144**	**99.9756**
		NMED REQUIRED CONTROL EFFICIENCY:		**99%**

Notes:
(1) - PPM = parts per million by volume
(2) - 0.01 ppm is the quantification limit for the detector used at the outlet.
(3) - Aeration Phase Test Run #1 started at 9:48, ended at 10:48.
(4) - Aeration Phase Test Run #2 started at 10:48, ended at 11:48.
(5) - Aeration Phase Test Run #3 started at 11:48, ended at 12:48.
(6) - During aeration testing, the average recorded catalyst bed temperature was 280 deg F

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APPENDICES

APPENDIX A

Calibration Data

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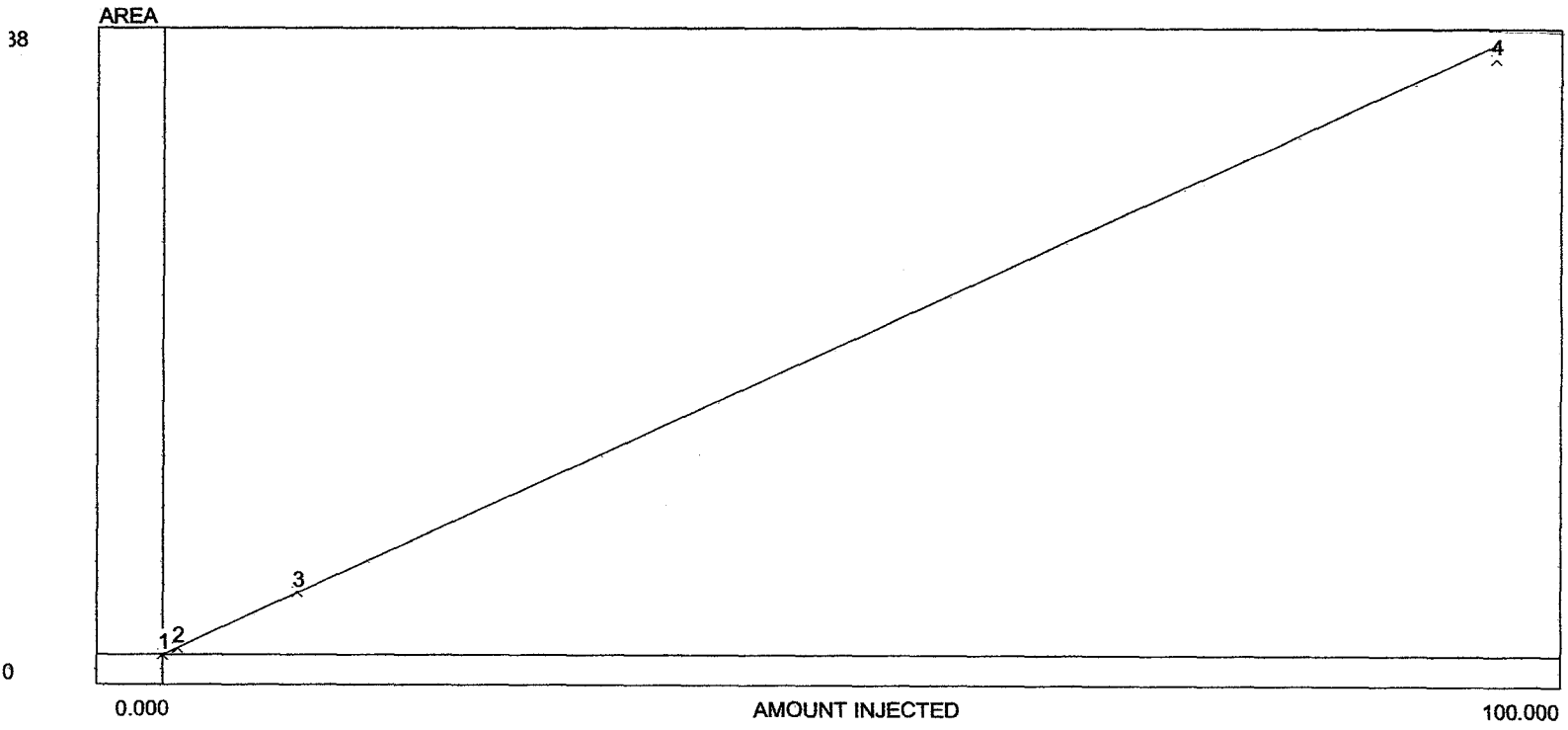
Component file: 359 1ster.cpt

Peak	Name	Start	End	Calibration	Int.Std	Units
1	Dead Vol / Air	0.000	0.350		0.000	
2	Ambient H2O	0.350	0.500		0.000	
3	Ethylene Oxide	0.500	0.600	C:\peak359\1Ster	0.000	16.ppm
4	Acetaldehyde	0.600	0.800		0.000	
5	CO2	0.800	1.000		0.000	

Calibration file: C:\peak359\1SterST2016.cal



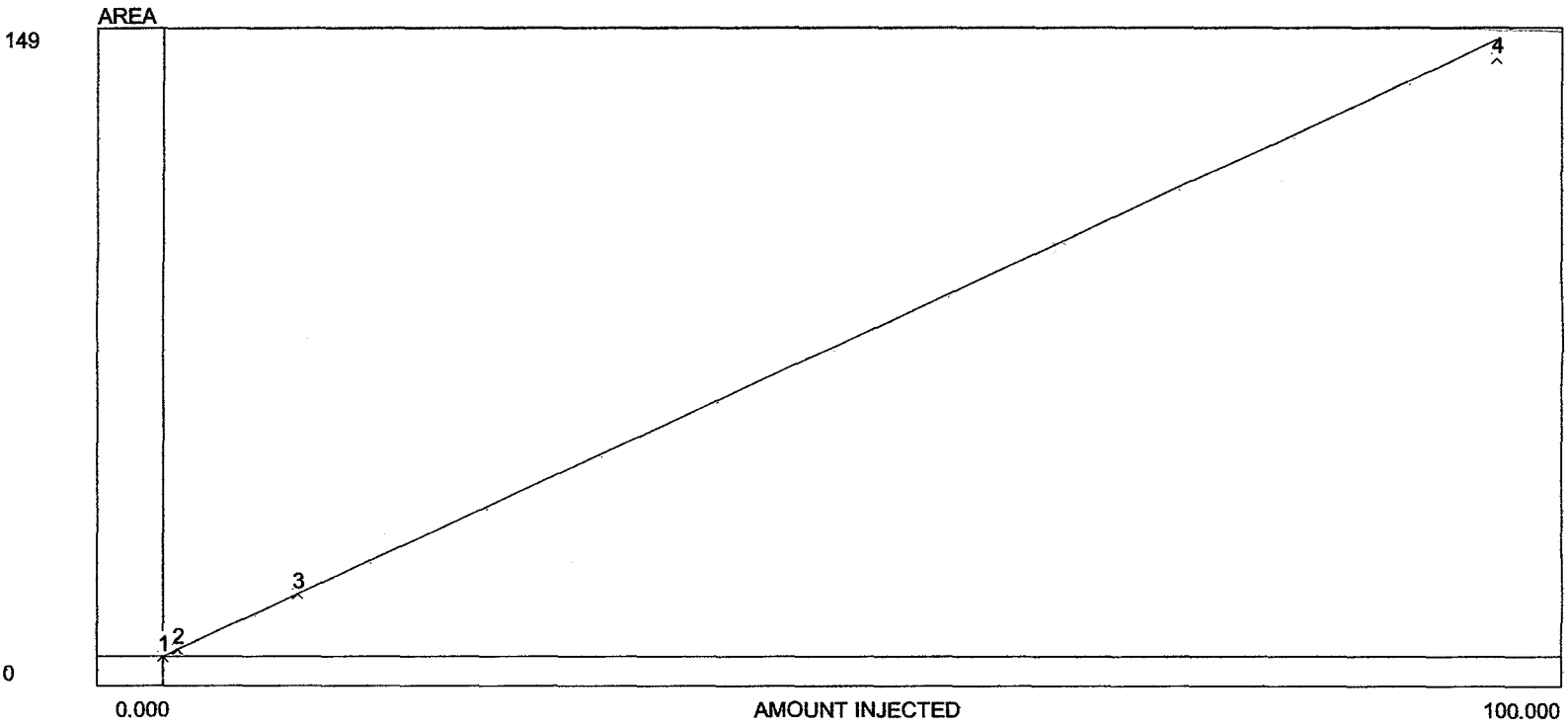
Avg slope of curve: 0.39
Y-axis intercept: 0.00
Linearity: 1.00
Number of levels: 4
SD/rel SD of CF's: 0.2/66.7
Y=0.3896X
r2: 1.0000
Last calibrated: Mon Nov 14 13:53:49 2016

Lvl.	Area/ht.	Amount	CF	Current	Previous #1	Previous #2
1	0.000	0.000	0.000	0.000	N/A	N/A
2	0.430	1.100	0.391	0.430	N/A	N/A
3	4.010	10.100	0.397	4.010	N/A	N/A
4	38.100	100.000	0.381	38.100	N/A	N/A

Component file: ST32-100.cpt

Peak	Name	Start	End	Calibration	Int.Std	Units
1	Dead Vol / Air	0.000	0.350		0.000	
2	Ambient H2O	0.350	0.500		0.000	
3	Ethylene Oxide	0.500	0.600	C:\peak359\2Ster	0.000	16.ppm
4	Acetaldehyde	0.600	0.800		0.000	
5	CO2	0.800	1.000		0.000	

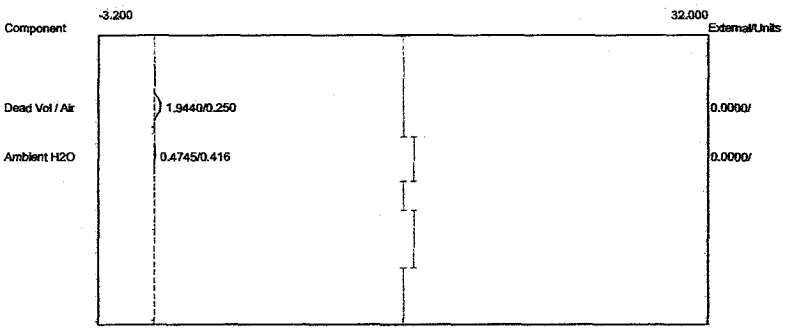
Calibration file: C:\peak359\2SterST2016.cal



Avg slope of curve: 1.54
Y-axis intercept: 0.00
Linearity: 1.00
Number of levels: 4
SD/rel SD of CF's: 0.8/66.7
Y=1.5358X
r2: 1.0000
Last calibrated: Mon Nov 14 13:53:06 2016

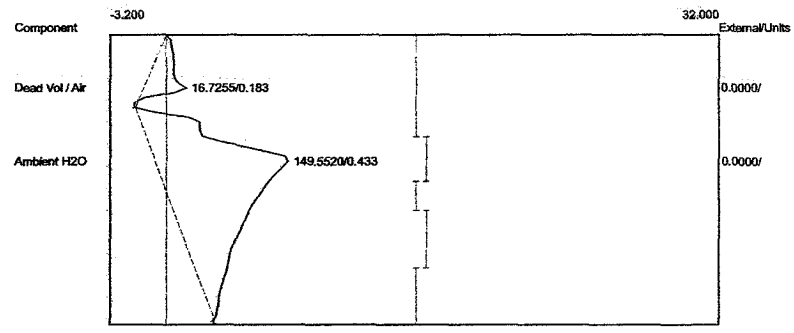
Lvl.	Area/ht.	Amount	CF	Current	Previous #1	Previous #2
1	0.000	0.000	0.000	0.000	N/A	N/A
2	1.730	1.100	1.573	1.730	N/A	N/A
3	15.600	10.100	1.545	15.600	N/A	N/A
4	149.000	100.000	1.490	149.000	N/A	N/A

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:22:56
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-Amb.CHR (c:\peak359)
Sample: Ambient Background
Operator: D. Kremer



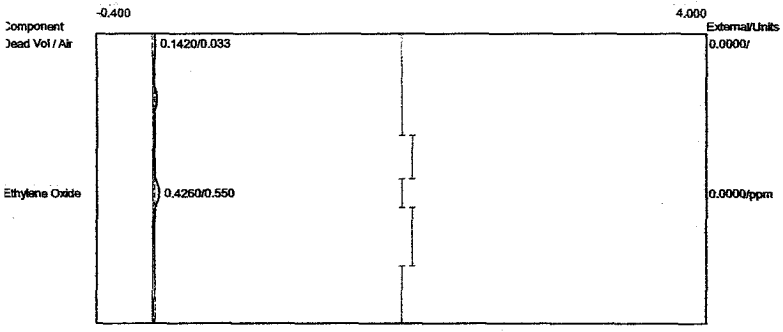
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.9440	0.0000	
Ambient H2O	0.416	0.4745	0.0000	
		2.4185	0.0000	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:22:56
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-Amb.CHR (c:\peak359)
Sample: Ambient Background
Operator: D. Kremer



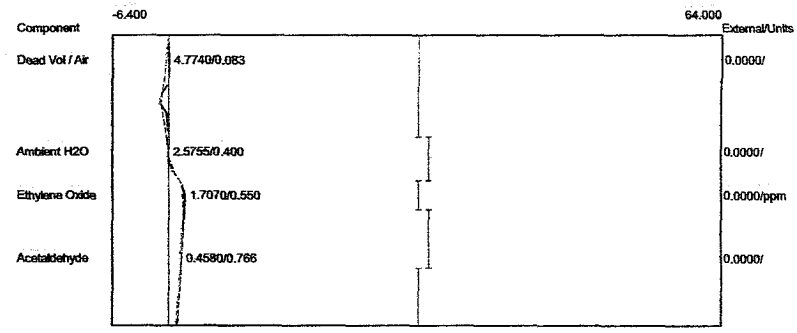
Component	Retention	Area	External	Units
Dead Vol / Air	0.183	16.7255	0.0000	
Ambient H2O	0.433	149.5520	0.0000	
		166.2775	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:25:44
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C01.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



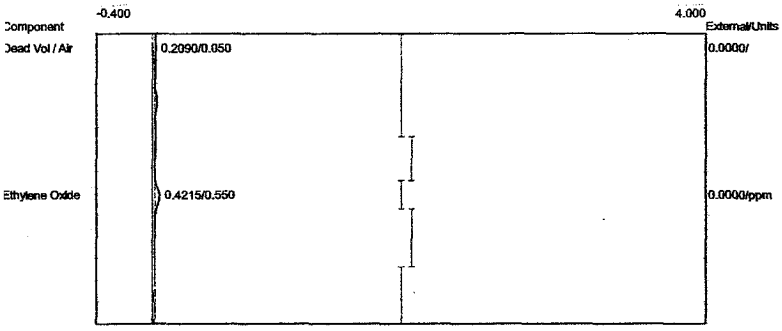
Component	Retention	Area	External	Units
Dead Vol / Air	0.033	0.1420	0.0000	
Ethylene Oxide	0.550	0.4260	0.0000	ppm
		0.5680	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:25:44
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C01.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



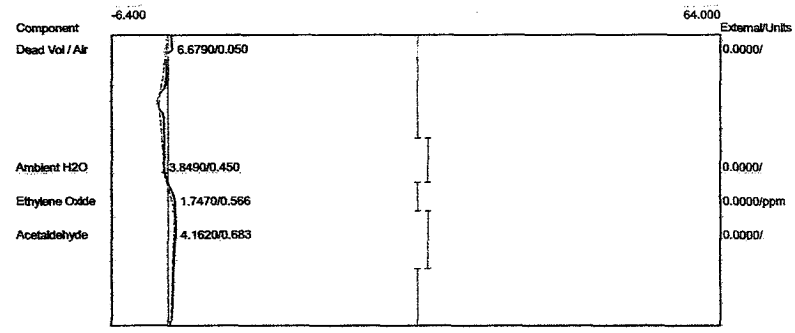
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	4.7740	0.0000	
Ambient H2O	0.400	2.5755	0.0000	
Ethylene Oxide	0.550	1.7070	0.0000	ppm
Acetaldehyde	0.766	0.4580	0.0000	
		9.5145	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:27:12
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C02.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



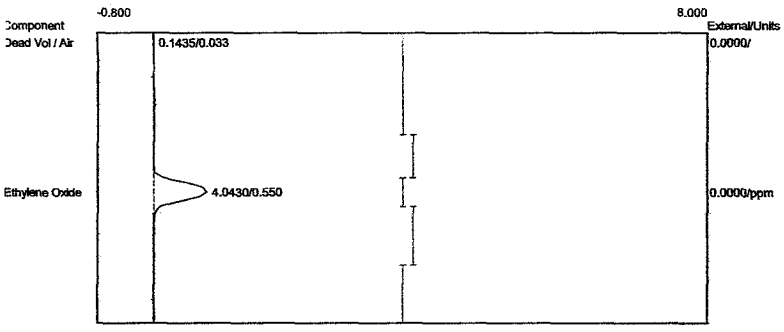
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	0.2090	0.0000	
Ethylene Oxide	0.550	0.4215	0.0000	ppm
		0.6305	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:27:12
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C02.CHR (c:\peak359)
Sample: 1.10 ppm EtO std
Operator: D. Kremer



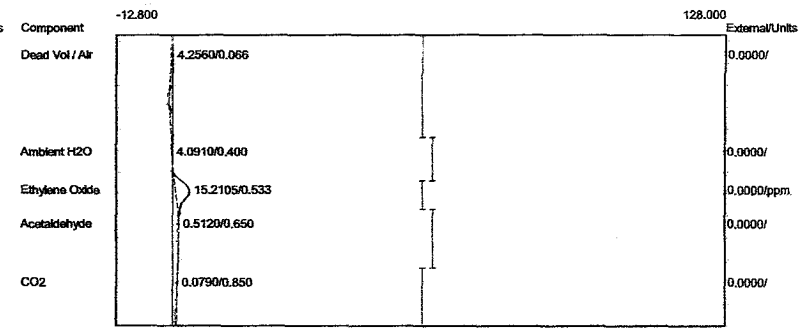
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	6.6790	0.0000	
Ambient H2O	0.450	3.8490	0.0000	
Ethylene Oxide	0.566	1.7470	0.0000	ppm
Acetaldehyde	0.683	4.1620	0.0000	
		16.4370	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:31:24
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C03.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



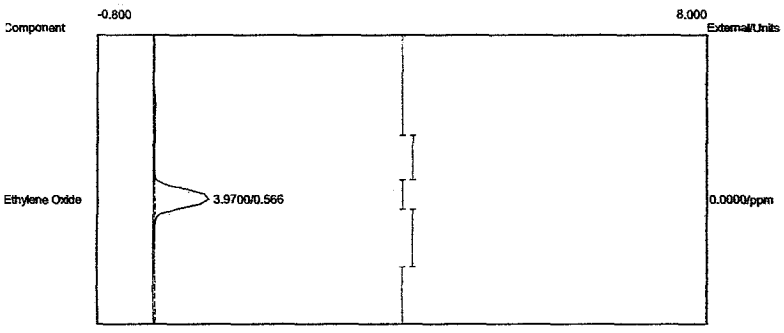
Component	Retention	Area	External	Units
Dead Vol / Air	0.033	0.1435	0.0000	
Ethylene Oxide	0.550	4.0430	0.0000	ppm
		4.1865	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:31:24
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C03.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



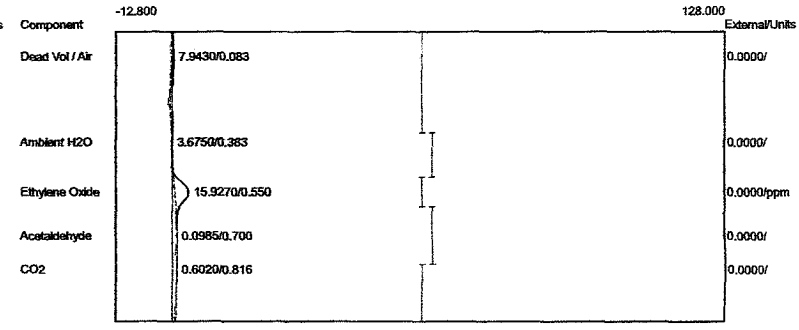
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	4.2560	0.0000	
Ambient H2O	0.400	4.0910	0.0000	
Ethylene Oxide	0.533	15.2105	0.0000	ppm
Acetaldehyde	0.650	0.5120	0.0000	
CO2	0.850	0.0790	0.0000	
		24.1485	0.0000	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:33:21
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C04.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



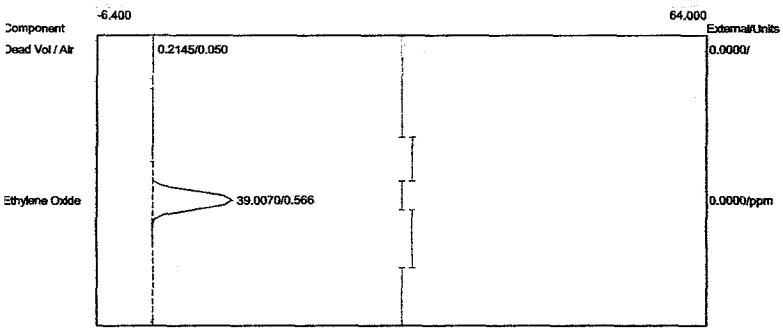
Component	Retention	Area	External	Units
Ethylene Oxide	0.566	3.9700	0.0000	ppm
		3.9700	0.0000	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:33:21
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C04.CHR (c:\peak359)
Sample: 10.1 ppm EtO std
Operator: D. Kremer



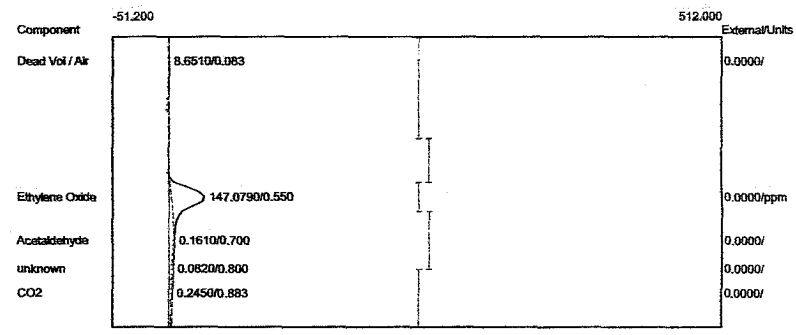
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	7.9430	0.0000	
Ambient H2O	0.383	3.6750	0.0000	
Ethylene Oxide	0.550	15.9270	0.0000	ppm
Acetaldehyde	0.700	0.0985	0.0000	
CO2	0.816	0.6020	0.0000	
		28.2455	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:36:20
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C05.CHR (c:\peak359)
Sample: 100 ppm EtO std
Operator: D. Kremer



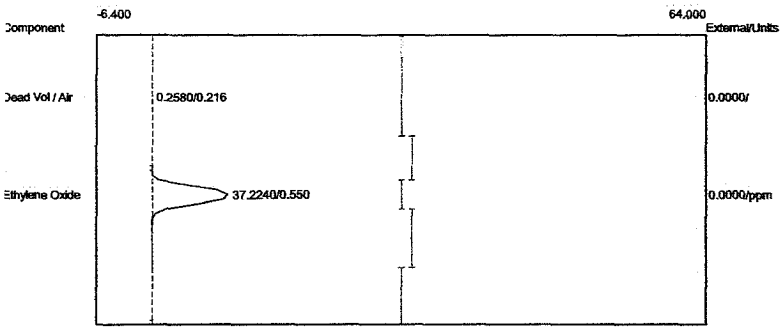
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	0.2145	0.0000	
Ethylene Oxide	0.566	39.0070	0.0000	ppm
		39.2215	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:36:20
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C05.CHR (c:\peak359)
Sample: 100 ppm EtO std
Operator: D. Kremer



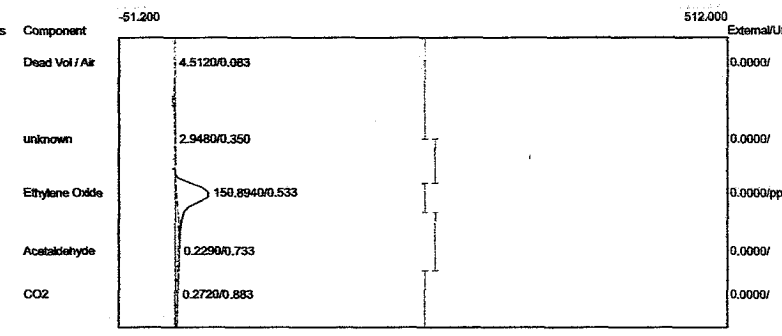
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	8.6510	0.0000	
Ethylene Oxide	0.550	147.0790	0.0000	ppm
Acetaldehyde	0.700	0.1610	0.0000	
CO2	0.883	0.2450	0.0000	
		156.1360	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:38:52
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C06.CHR (c:\peak359)
Sample: 100 ppm EtO std
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.216	0.2580	0.0000	
Ethylene Oxide	0.550	37.2240	0.0000	ppm
		37.4820	0.0000	

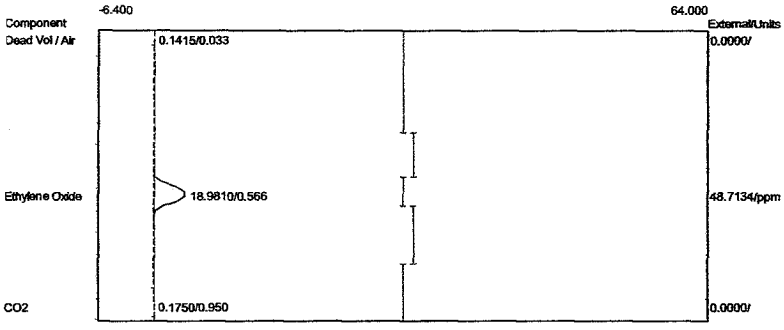
Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:38:52
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C06.CHR (c:\peak359)
Sample: 100 ppm EtO std
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.083	4.5120	0.0000	
Ethylene Oxide	0.533	150.8940	0.0000	ppm
Acetaldehyde	0.733	0.2290	0.0000	
CO2	0.883	0.2720	0.0000	
		155.9070	0.0000	

Lab name: ESSI

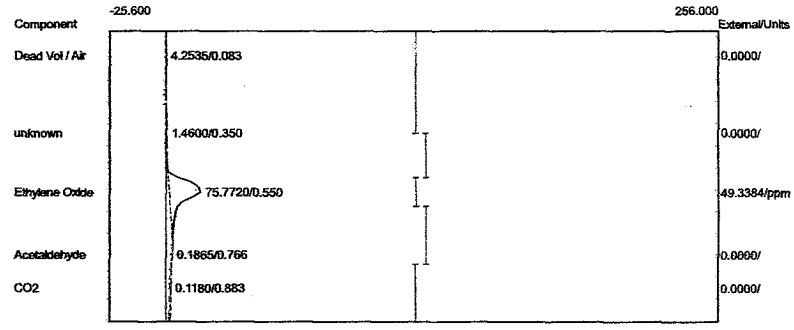
Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:52:07
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C07.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.033	0.1415	0.0000	
Ethylene Oxide	0.566	18.9810	48.7134	ppm
CO2	0.950	0.1750	0.0000	
		19.2975	48.7134	

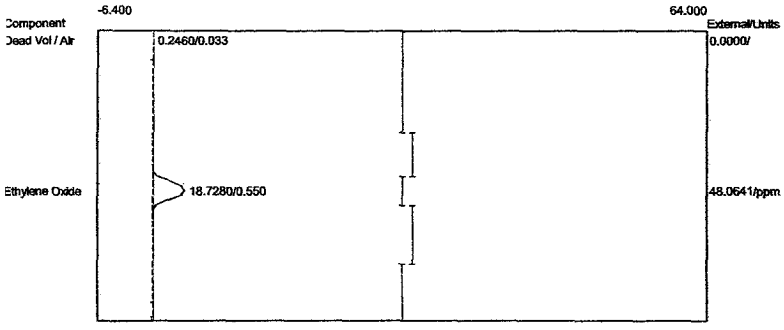
Lab name: ESSI

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/14/2016 13:52:07
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C07.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer



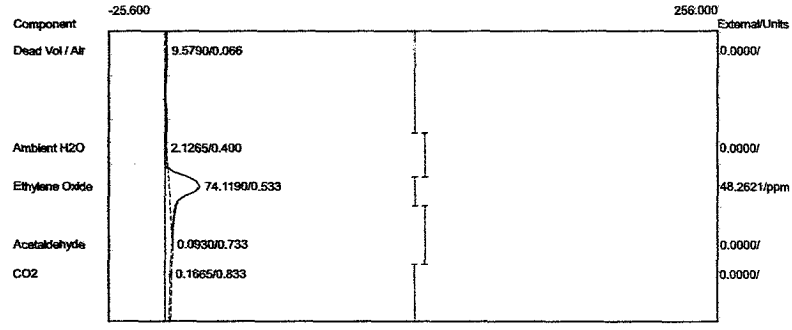
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	4.2535	0.0000	
Ethylene Oxide	0.550	75.7720	49.3384	ppm
Acetaldehyde	0.766	0.1865	0.0000	
CO2	0.883	0.1180	0.0000	
		80.3300	49.3384	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/15/2016 08:00:54
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C08.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer



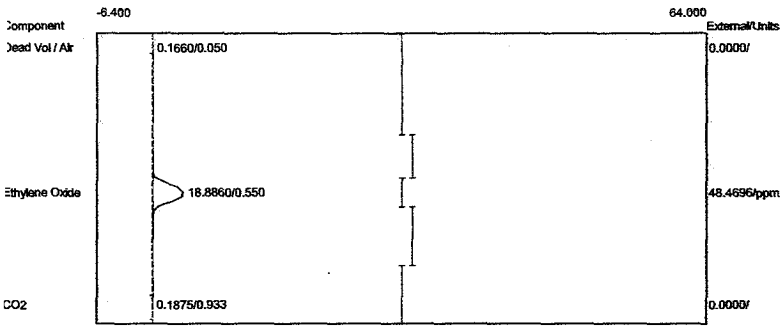
Component	Retention	Area	External	Units
Dead Vol / Air	0.033	0.2460	0.0000	
Ethylene Oxide	0.550	18.7280	48.0641	ppm
		18.9740	48.0641	

Client: Sterigenics - Santa Teresa
Client ID: PreCal
Analysis date: 11/15/2016 08:00:54
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C08.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer



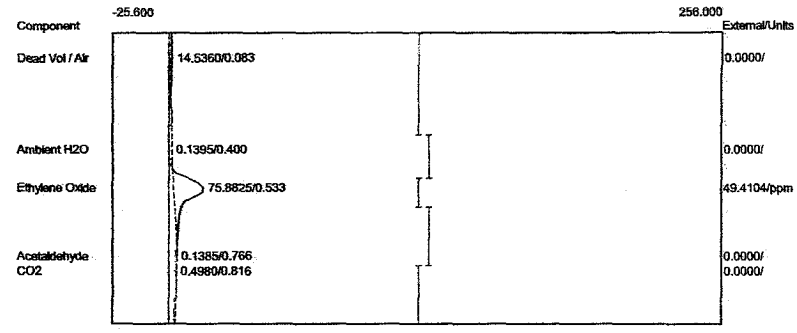
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	9.5790	0.0000	
Ambient H2O	0.400	2.1265	0.0000	
Ethylene Oxide	0.533	74.1190	48.2621	ppm
Acetaldehyde	0.733	0.0930	0.0000	
CO2	0.833	0.1665	0.0000	
		86.0840	48.2621	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: PostCal
Analysis date: 11/15/2016 12:45:27
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-C09.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.050	0.1660	0.0000	
Ethylene Oxide	0.550	18.8860	48.4696	ppm
CO2	0.933	0.1875	0.0000	
		19.2395	48.4696	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: PostCal
Analysis date: 11/15/2016 12:45:27
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-C09.CHR (c:\peak359)
Sample: 48.8 ppm EtO std
Operator: D. Kremer

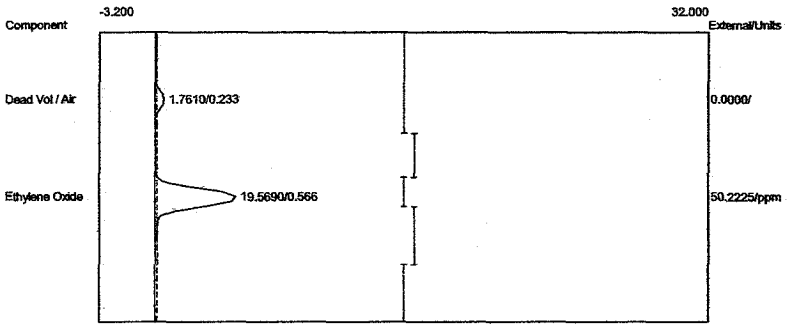


Component	Retention	Area	External	Units
Dead Vol / Air	0.083	14.5360	0.0000	
Ambient H2O	0.400	0.1395	0.0000	
Ethylene Oxide	0.533	75.8825	49.4104	ppm
Acetaldehyde	0.766	0.1385	0.0000	
CO2	0.816	0.4980	0.0000	
		91.1945	49.4104	

APPENDIX B

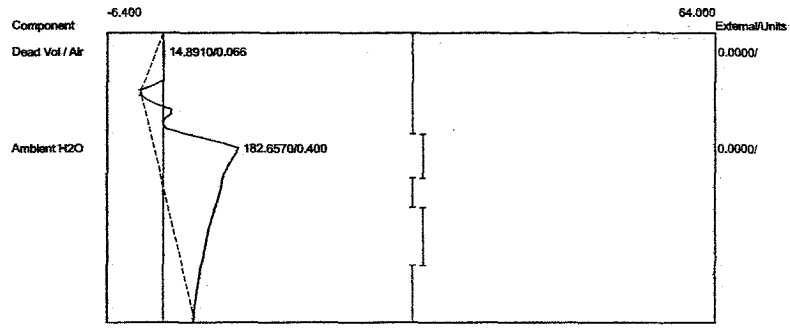
Run #1 Chromatograms – Backvent

Lab Name: ESCI
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:34:29
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack-B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B01.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



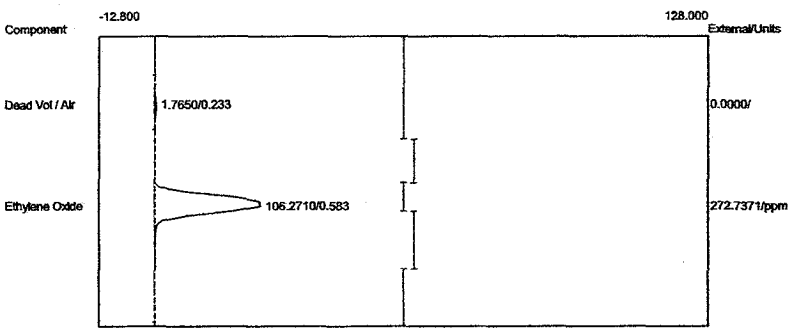
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7610	0.0000	
Ethylene Oxide	0.566	19.5690	50.2225	ppm
		21.3300	50.2225	

Lab Name: ESCI
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:34:29
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack-B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B01.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



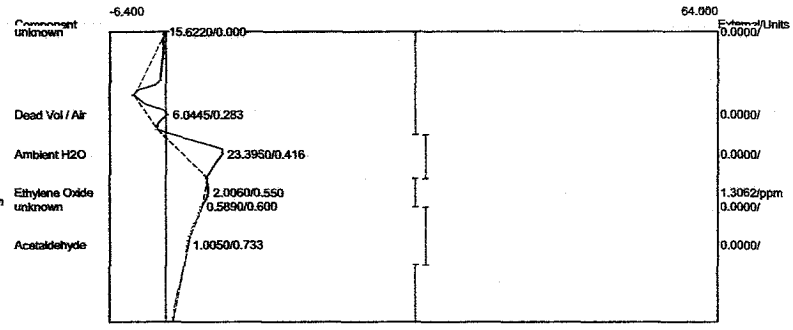
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	14.8910	0.0000	
Ambient H2O	0.400	182.6570	0.0000	
		197.5480	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:35:35
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B02.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



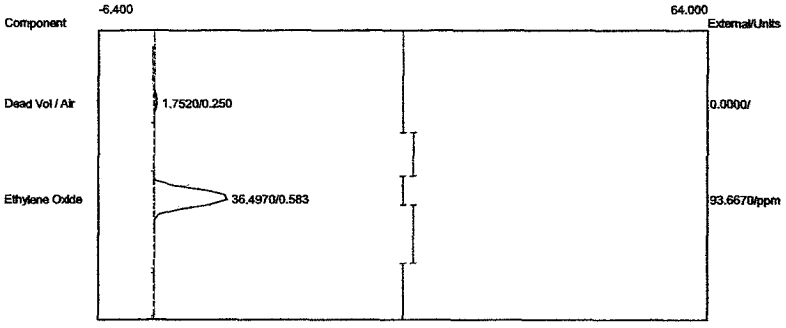
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7650	0.0000	
Ethylene Oxide	0.583	106.2710	272.7371	ppm
		108.0360	272.7371	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:35:35
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B02.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



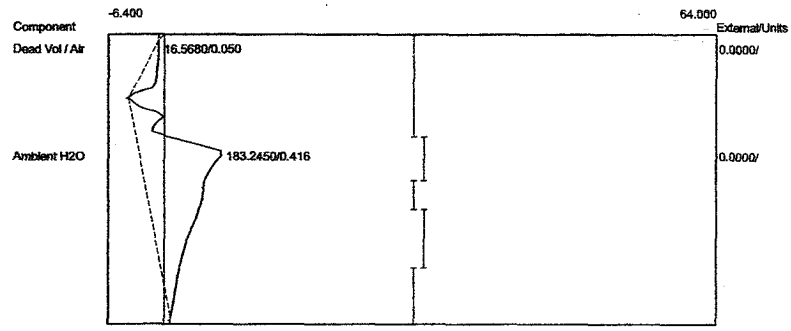
Component	Retention	Area	External	Units
Dead Vol / Air	0.283	6.0445	0.0000	
Ambient H2O	0.416	23.3950	0.0000	
Ethylene Oxide	0.550	2.0060	1.3062	ppm
Acetaldehyde	0.733	1.0050	0.0000	
		32.4505	1.3062	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:36:54
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B03.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



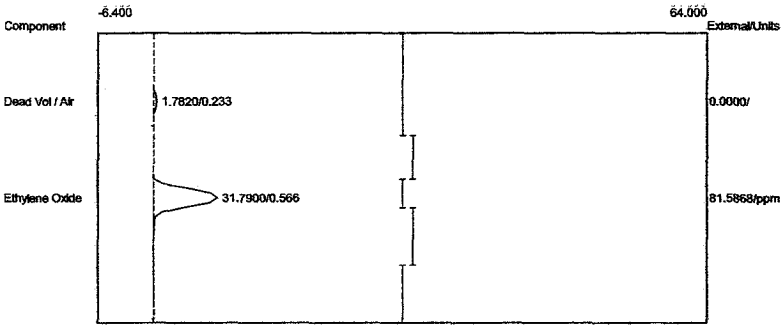
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7520	0.0000	
Ethylene Oxide	0.583	36.4970	93.6670	ppm
		38.2490	93.6670	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:36:54
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B03.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



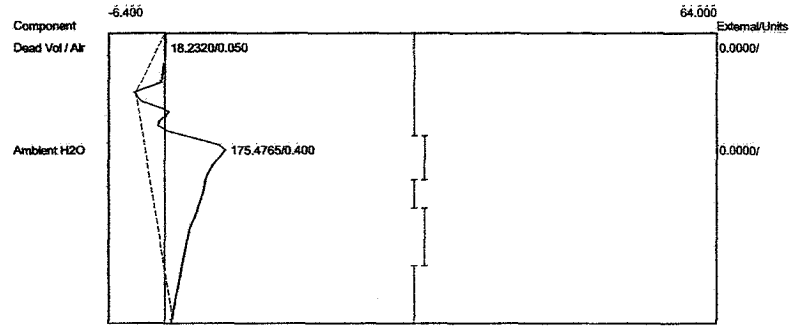
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	16.5680	0.0000	
Ambient H2O	0.416	183.2450	0.0000	
		199.8130	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:37:59
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B04.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



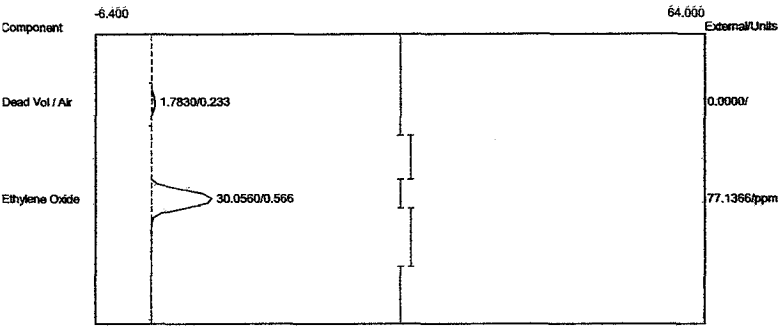
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7820	0.0000	
Ethylene Oxide	0.566	31.7900	81.5868	ppm
		33.5720	81.5868	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:37:59
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B04.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



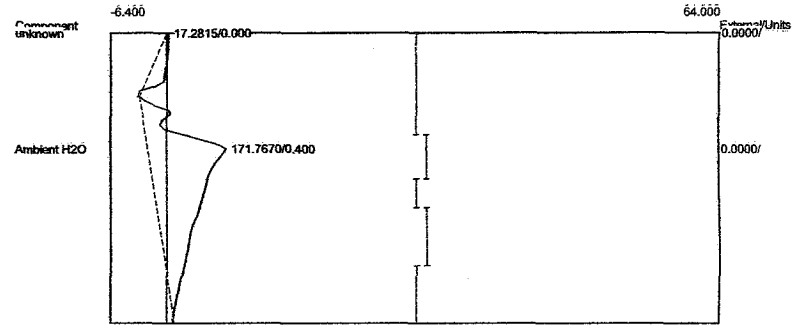
Component	Retention	Area	External	Units
Dead Vol / Air	0.050	18.2320	0.0000	
Ambient H2O	0.400	175.4765	0.0000	
		193.7085	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:39:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B05.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



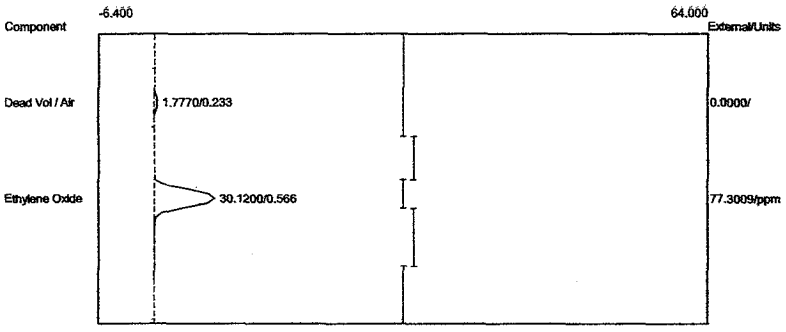
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7830	0.0000	
Ethylene Oxide	0.566	30.0560	77.1366	ppm
		31.8390	77.1366	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:39:05
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B05.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



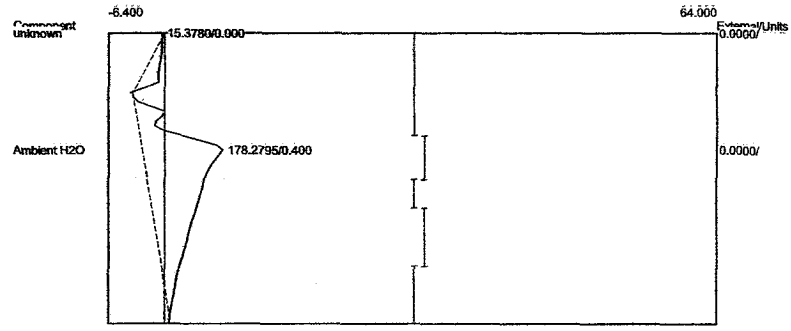
Component	Retention	Area	External	Units
Ambient H2O	0.400	171.7670	0.0000	
		171.7670	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:40:17
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B06.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



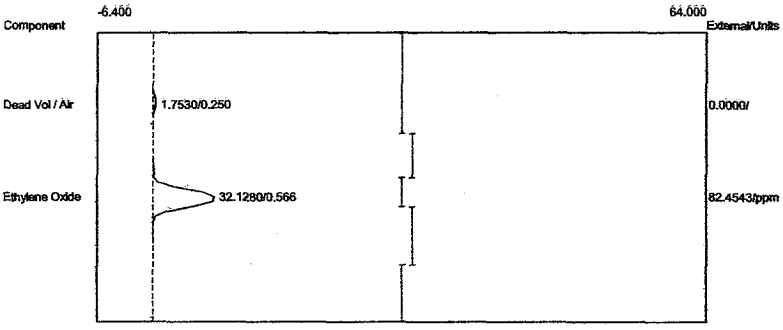
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7770	0.0000	
Ethylene Oxide	0.566	30.1200	77.3009	ppm
		31.8970	77.3009	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:40:17
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B06.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



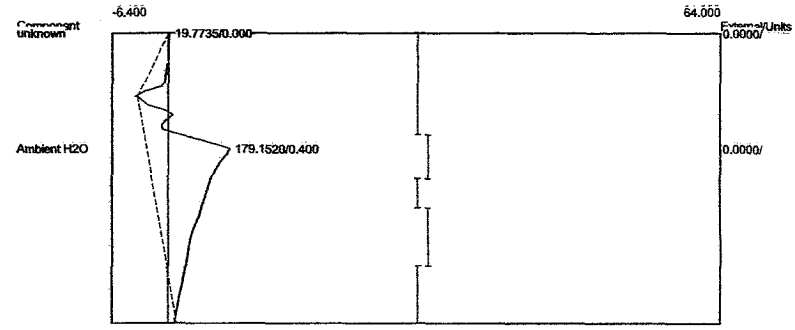
Component	Retention	Area	External	Units
Ambient H2O	0.400	178.2795	0.0000	
		178.2795	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:41:22
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B07.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7530	0.0000	
Ethylene Oxide	0.566	32.1280	82.4543	ppm
		33.8810	82.4543	

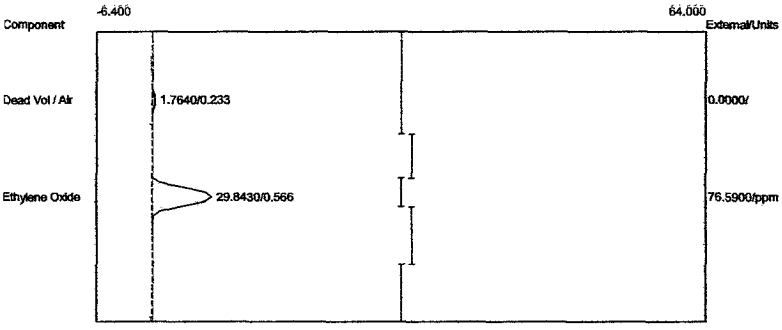
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:41:22
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B07.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Ambient H2O	0.400	179.1520	0.0000	
		179.1520	0.0000	

Lab name: ESC

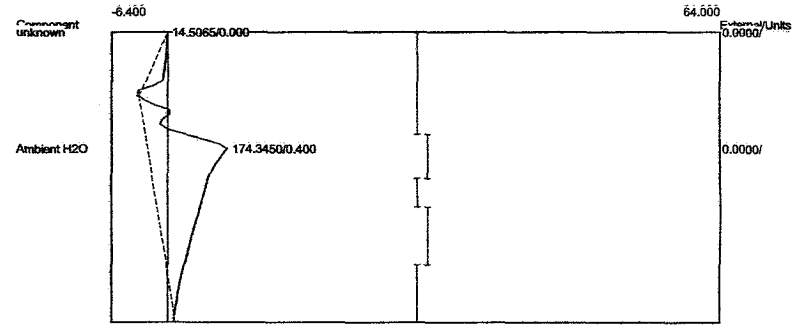
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:42:32
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B08.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7640	0.0000	
Ethylene Oxide	0.566	29.8430	76.5900	ppm
		31.6070	76.5900	

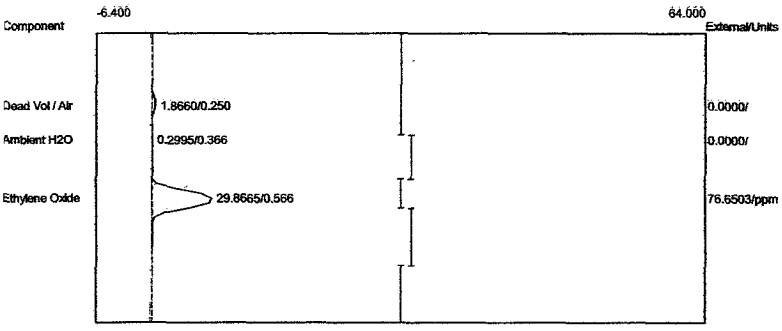
Lab name: ESC

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:42:32
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B08.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



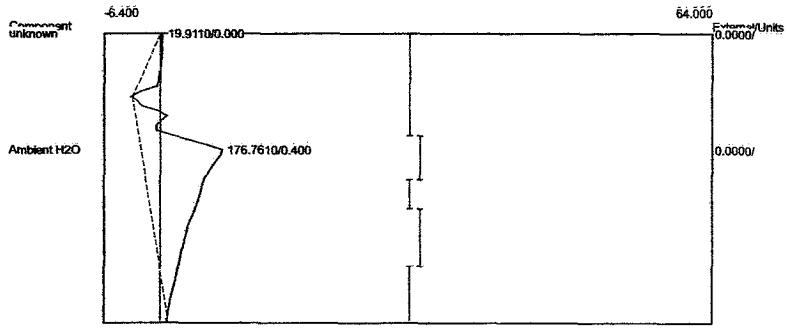
Component	Retention	Area	External	Units
Ambient H2O	0.400	174.3450	0.0000	
		174.3450	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:43:37
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B09.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



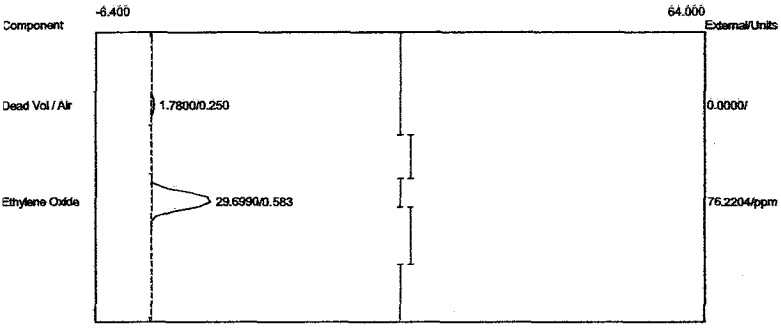
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.8660	0.0000	
Ambient H2O	0.366	0.2995	0.0000	
Ethylene Oxide	0.566	29.8665	76.6503	ppm
		32.0320	76.6503	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:43:37
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B09.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



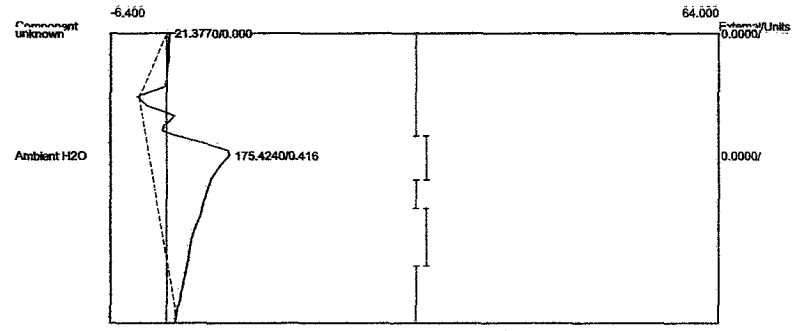
Component	Retention	Area	External	Units
Ambient H2O	0.400	176.7610	0.0000	
		176.7610	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:44:42
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B10.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



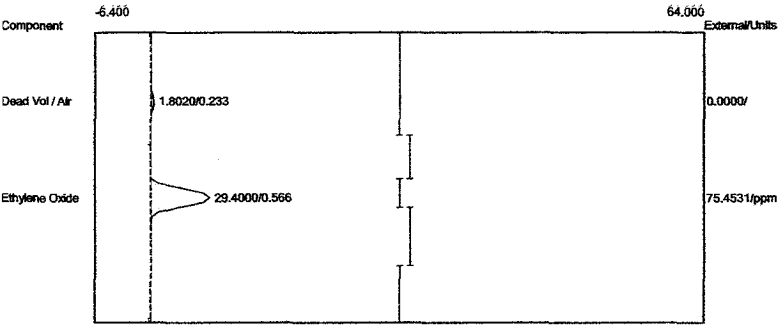
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7800	0.0000	
Ethylene Oxide	0.583	29.6990	76.2204	ppm
		31.4790	76.2204	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:44:42
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B10.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



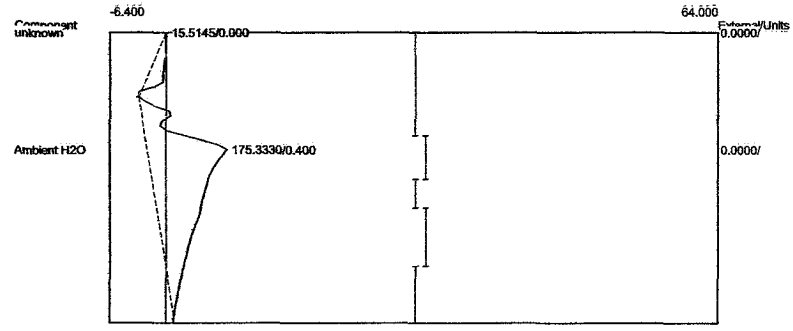
Component	Retention	Area	External	Units
Ambient H2O	0.416	175.4240	0.0000	
		175.4240	0.0000	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:45:55
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B11.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



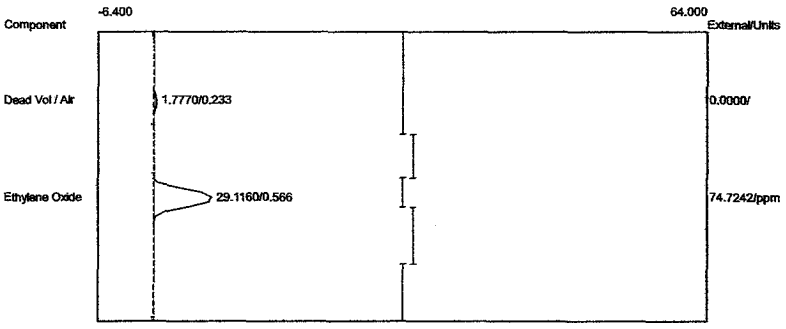
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.8020	0.0000	
Ethylene Oxide	0.566	29.4000	75.4531	ppm
		31.2020	75.4531	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:45:55
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B11.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



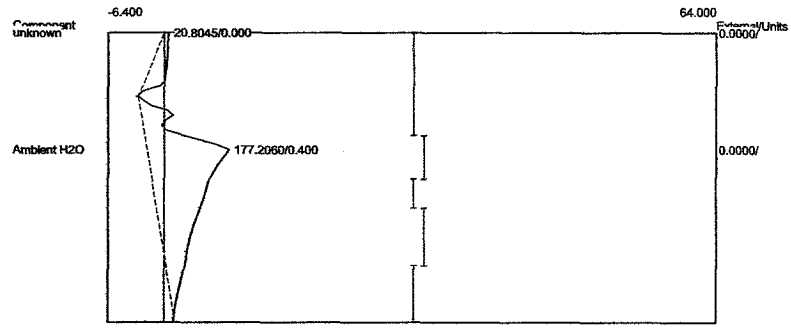
Component	Retention	Area	External	Units
Ambient H2O	0.400	175.3330	0.0000	
		175.3330	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:46:59
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B12.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7770	0.0000	
Ethylene Oxide	0.566	29.1160	74.7242	ppm
		30.8930	74.7242	

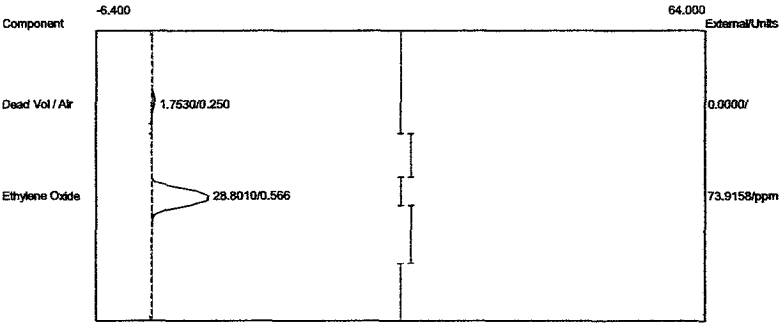
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:46:59
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B12.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Ambient H2O	0.400	177.2060	0.0000	
		177.2060	0.0000	

Lab name: ESC

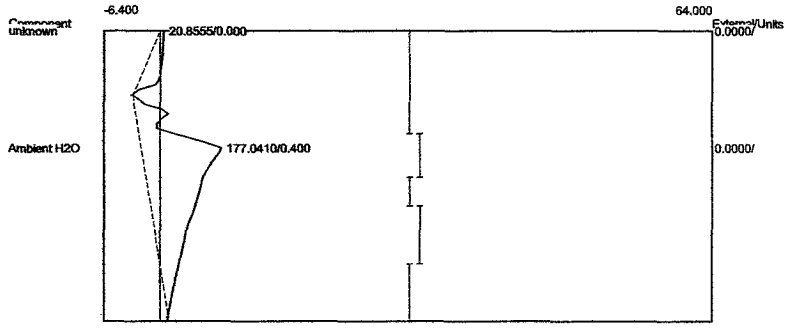
Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:48:08
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-B13.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7530	0.0000	
Ethylene Oxide	0.566	28.8010	73.9158	ppm
		30.5540	73.9158	

Lab name: ESC

Client: Sterigenics - Santa Teresa
Client ID: Backvent
Analysis date: 11/15/2016 09:48:08
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-B13.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer

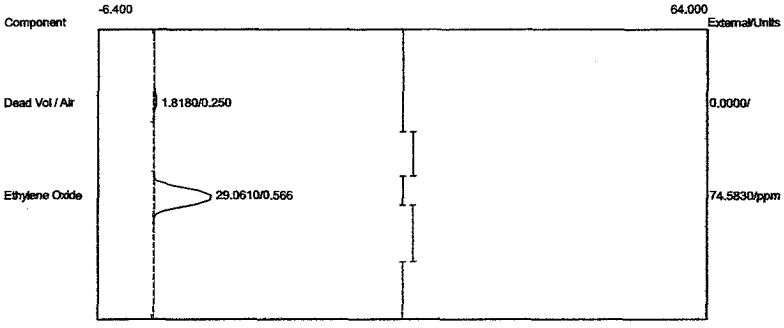


Component	Retention	Area	External	Units
Ambient H2O	0.400	177.0410	0.0000	
		177.0410	0.0000	

APPENDIX C

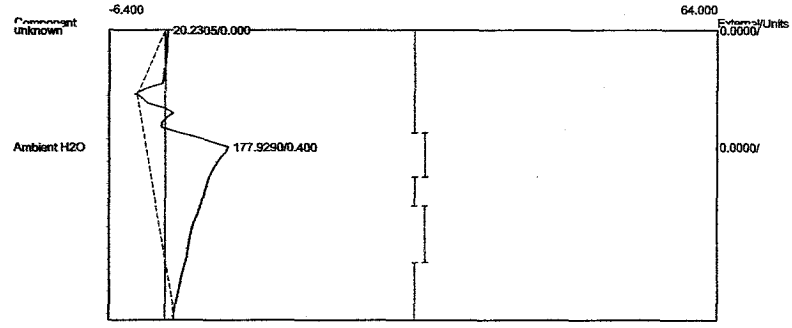
Run #1 Chromatograms – Aeration

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 09:49:15
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A01.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



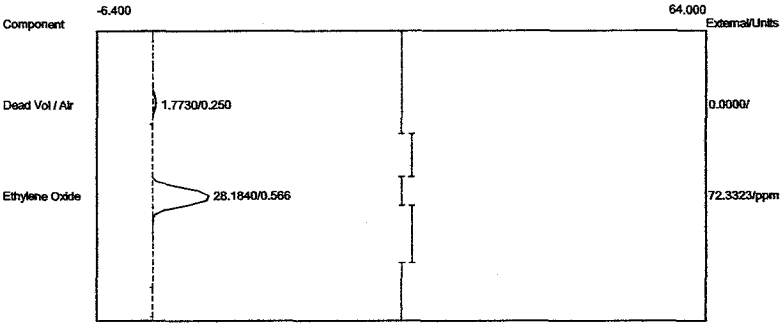
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.8180	0.0000	
Ethylene Oxide	0.566	29.0610	74.5830	ppm
		30.8790	74.5830	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 09:49:15
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A01.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



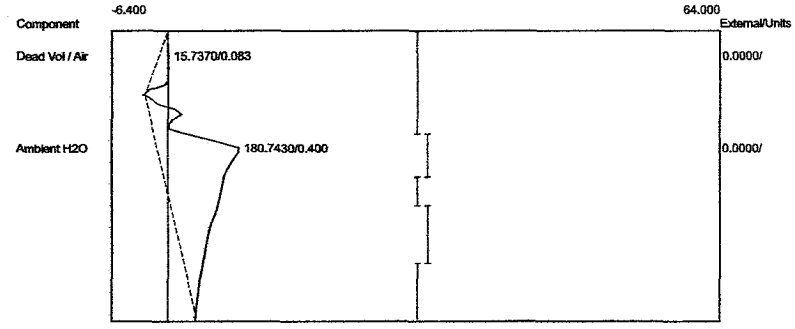
Component	Retention	Area	External	Units
Ambient H2O	0.400	177.9290	0.0000	
		177.9290	0.0000	

Lab name: ESSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 09:54:07
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A02.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7730	0.0000	
Ethylene Oxide	0.566	28.1840	72.3323	ppm
		29.9570	72.3323	

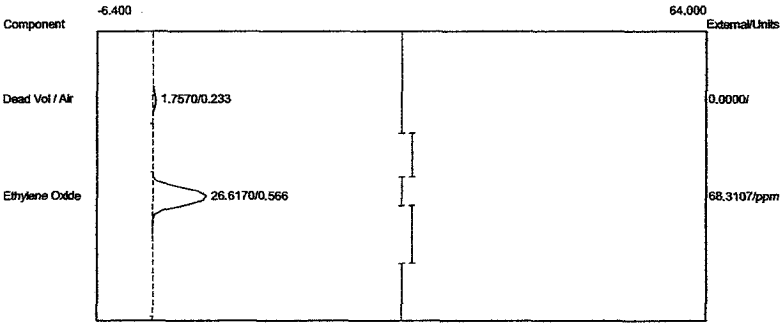
Lab name: ESSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 09:54:07
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A02.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.083	15.7370	0.0000	
Ambient H2O	0.400	180.7430	0.0000	
		196.4800	0.0000	

Lab name: ESSI

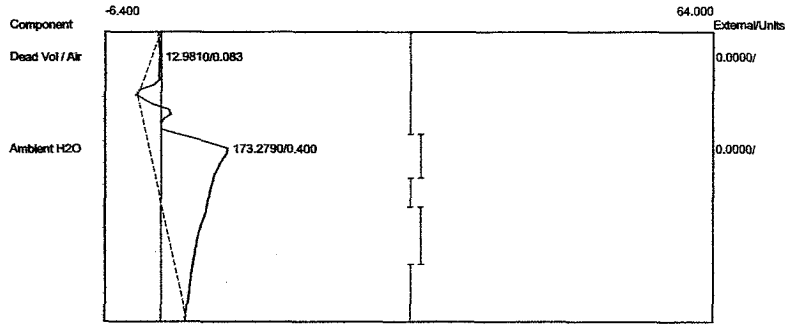
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 09:59:30
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A03.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7570	0.0000	
Ethylene Oxide	0.566	26.6170	68.3107	ppm
		28.3740	68.3107	

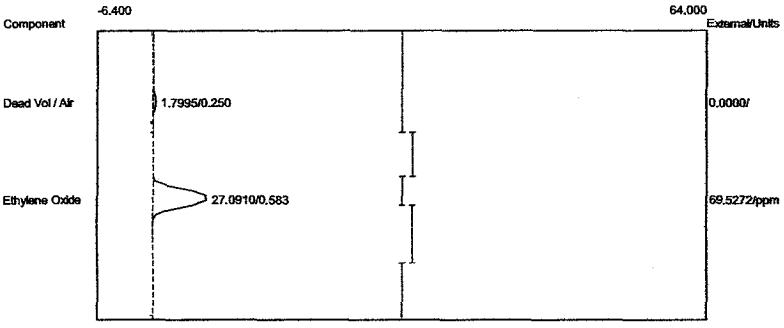
Lab name: ESSI

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 09:59:30
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A03.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



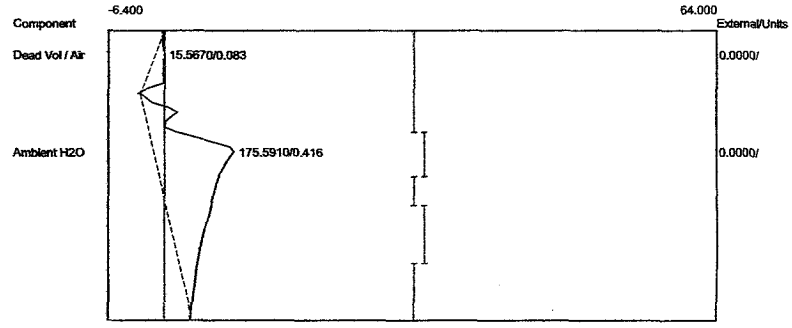
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	12.9810	0.0000	
Ambient H2O	0.400	173.2790	0.0000	
		186.2600	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:04:02
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A04.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



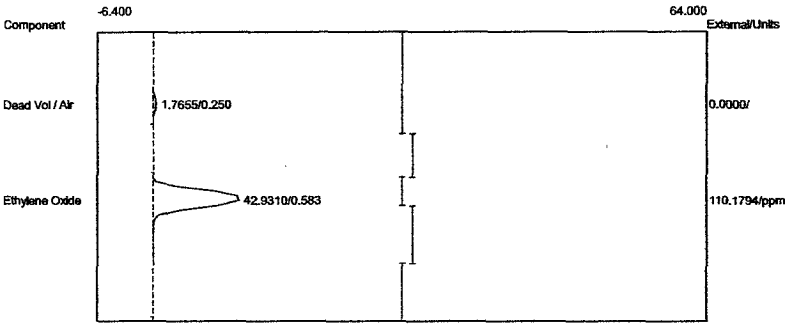
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7995	0.0000	
Ethylene Oxide	0.583	27.0910	69.5272	ppm
		28.8905	69.5272	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:04:02
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A04.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



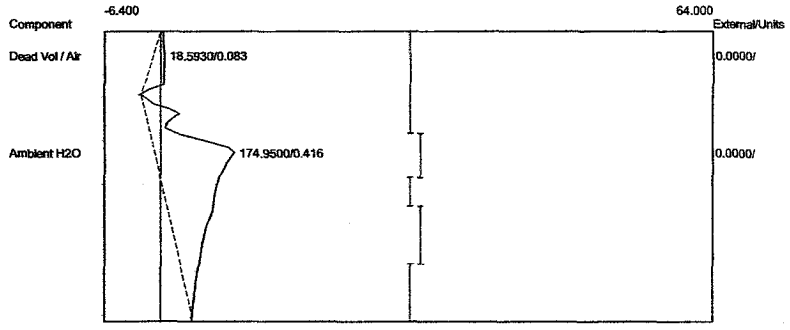
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	15.5670	0.0000	
Ambient H2O	0.416	175.5910	0.0000	
		191.1580	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:09:43
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A05.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



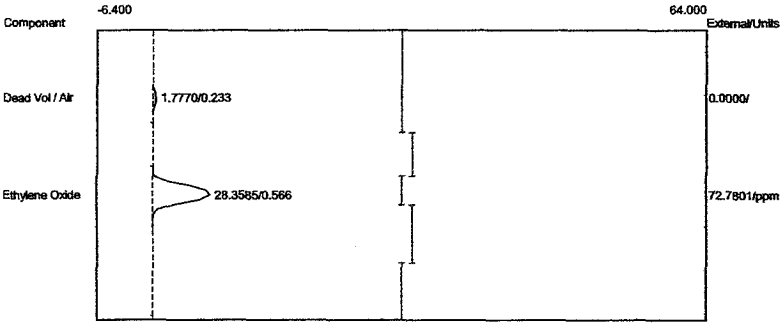
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7655	0.0000	
Ethylene Oxide	0.583	42.9310	110.1794	ppm
		44.6965	110.1794	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:09:43
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A05.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



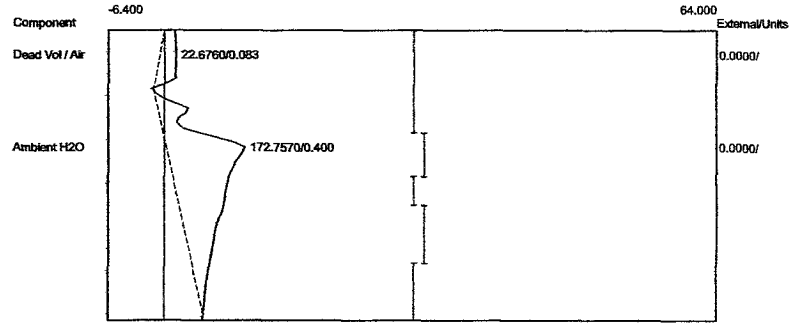
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	18.5930	0.0000	
Ambient H2O	0.416	174.9500	0.0000	
		193.5430	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:14:15
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A06.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



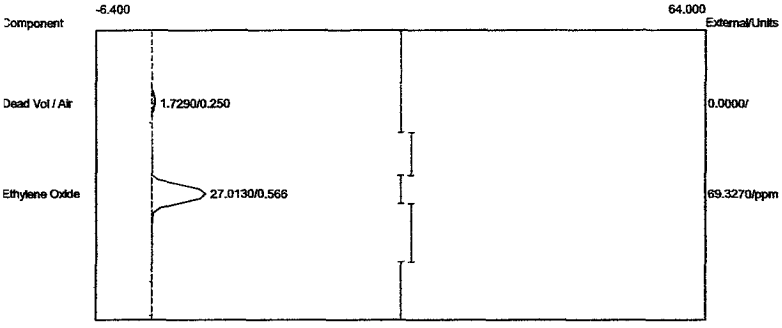
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7770	0.0000	
Ethylene Oxide	0.566	28.3585	72.7801	ppm
		30.1355	72.7801	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:14:15
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A06.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



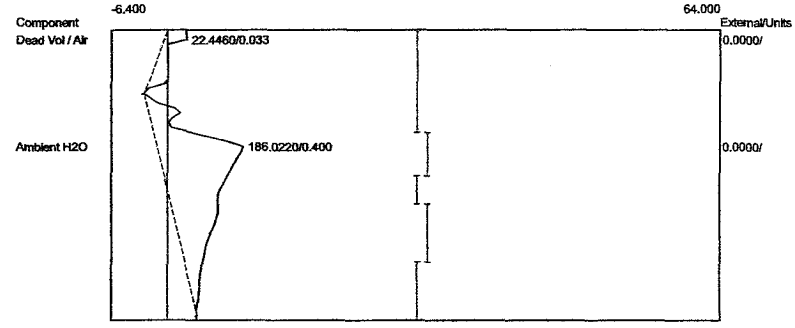
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	22.6760	0.0000	
Ambient H2O	0.400	172.7570	0.0000	
		195.4330	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:19:09
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A07.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



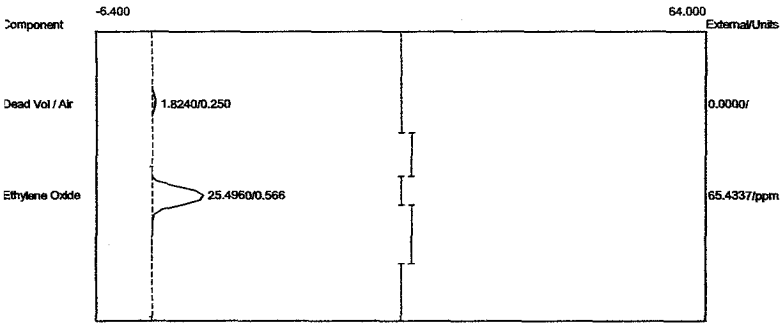
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7290	0.0000	
Ethylene Oxide	0.566	27.0130	69.3270	ppm
		28.7420	69.3270	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:19:09
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A07.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



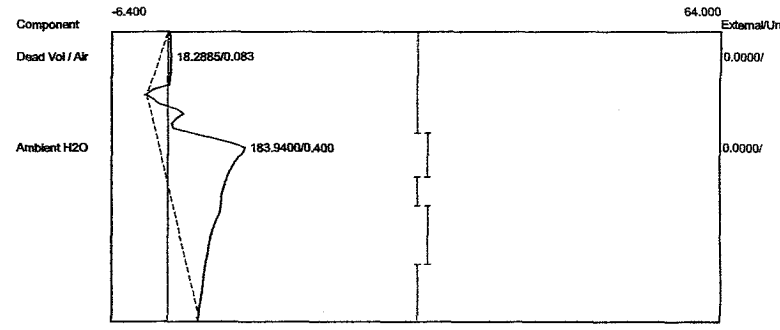
Component	Retention	Area	External	Units
Dead Vol / Air	0.033	22.4460	0.0000	
Ambient H2O	0.400	186.0220	0.0000	
		208.4680	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:24:21
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A08.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



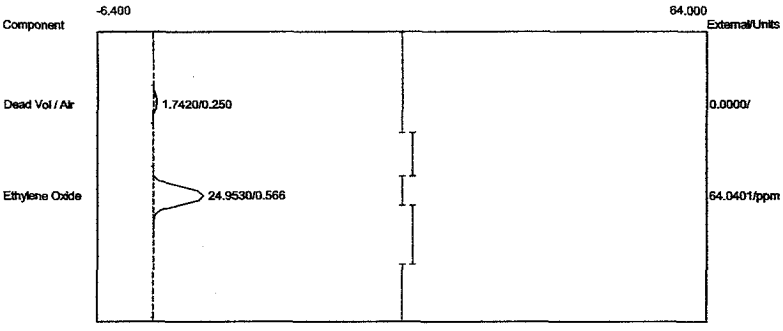
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.8240	0.0000	
Ethylene Oxide	0.566	25.4960	65.4337	ppm
		27.3200	65.4337	

Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:24:21
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A08.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



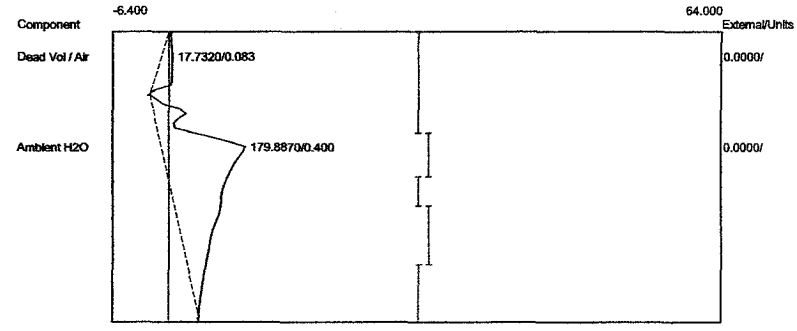
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	18.2885	0.0000	
Ambient H2O	0.400	183.9400	0.0000	
		202.2285	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:29:44
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A09.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



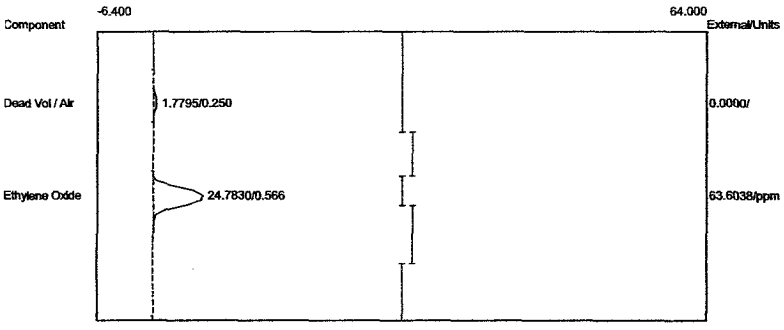
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7420	0.0000	
Ethylene Oxide	0.566	24.9530	64.0401	ppm
		26.6950	64.0401	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:29:44
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A09.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



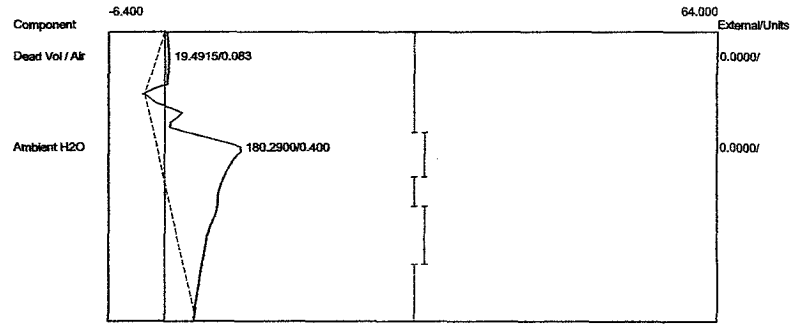
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	17.7320	0.0000	
Ambient H2O	0.400	179.8870	0.0000	
		197.6190	0.0000	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:34:18
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A10.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



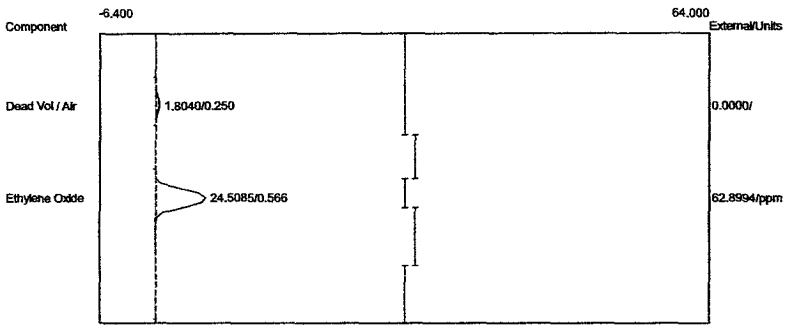
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7795	0.0000	
Ethylene Oxide	0.566	24.7830	63.6038	ppm
		26.5625	63.6038	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:34:18
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A10.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



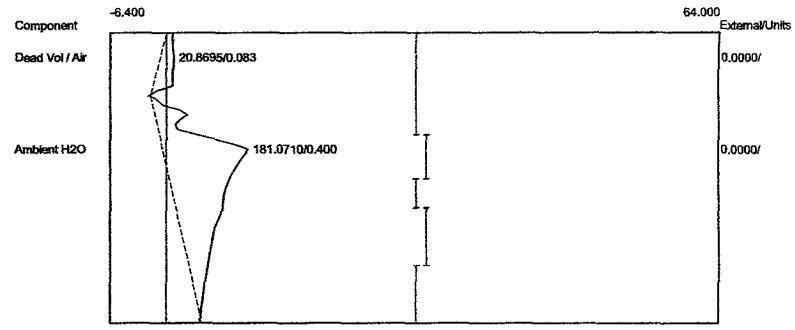
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	19.4915	0.0000	
Ambient H2O	0.400	180.2900	0.0000	
		199.7815	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:39:08
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A11.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



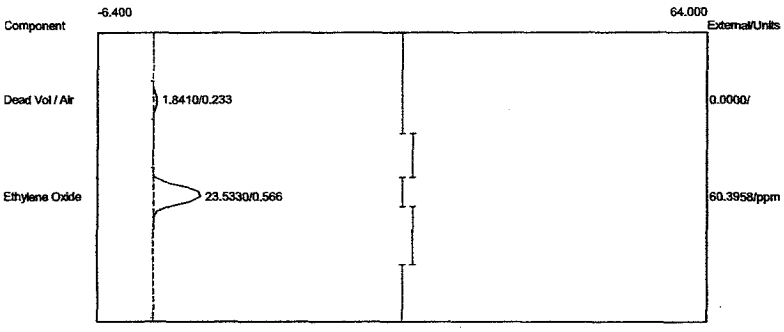
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.8040	0.0000	
Ethylene Oxide	0.566	24.5085	62.8994	ppm
		26.3125	62.8994	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:39:08
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A11.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



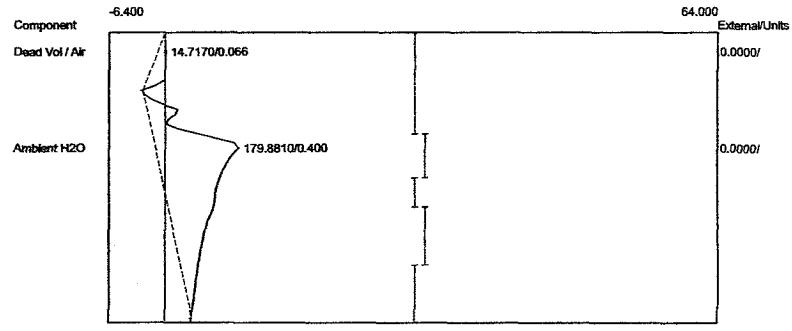
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	20.8695	0.0000	
Ambient H2O	0.400	181.0710	0.0000	
		201.9405	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:44:05
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-1A12.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.8410	0.0000	
Ethylene Oxide	0.566	23.5330	60.3958	ppm
		25.3740	60.3958	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#1
Analysis date: 11/15/2016 10:44:05
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-1A12.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer

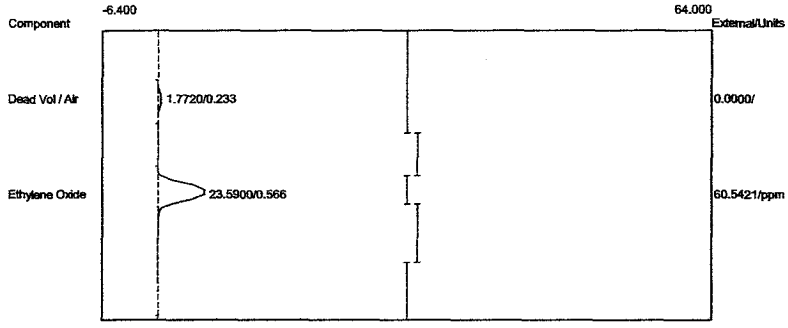


Component	Retention	Area	External	Units
Dead Vol / Air	0.066	14.7170	0.0000	
Ambient H2O	0.400	179.8810	0.0000	
		194.5980	0.0000	

APPENDIX D

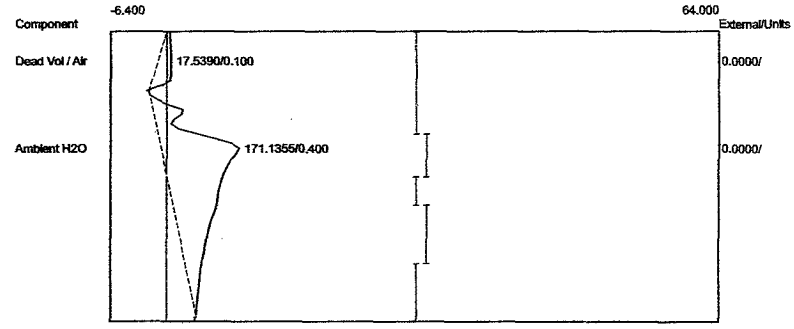
Run #2 Chromatograms – Aeration

Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 10:49:10
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A01.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



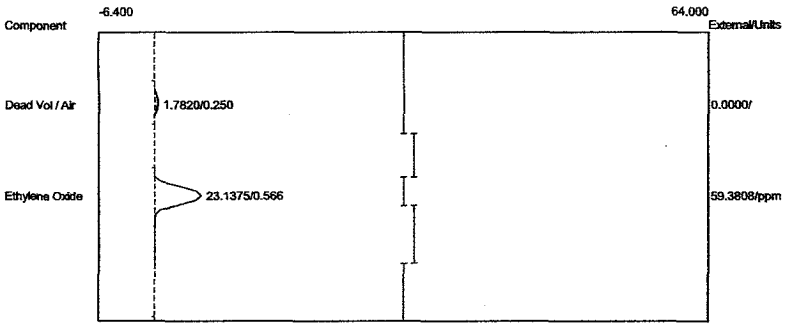
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7720	0.0000	
Ethylene Oxide	0.566	23.5900	60.5421	ppm
		25.3620	60.5421	

Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 10:49:10
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A01.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



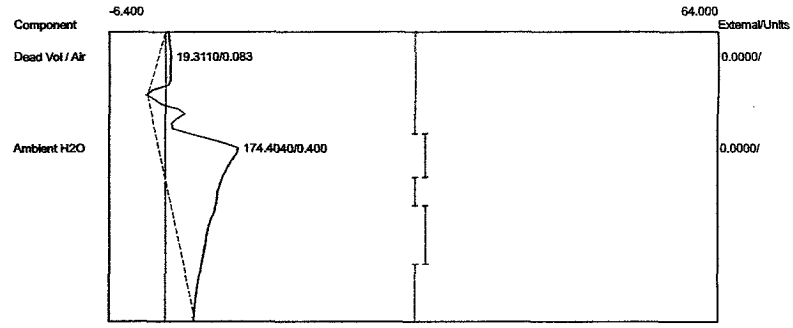
Component	Retention	Area	External	Units
Dead Vol / Air	0.100	17.5390	0.0000	
Ambient H2O	0.400	171.1355	0.0000	
		188.6745	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 10:54:08
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A02.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



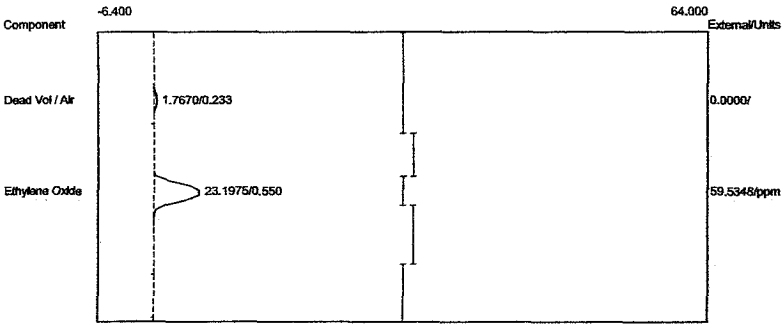
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7820	0.0000	
Ethylene Oxide	0.566	23.1375	59.3808	ppm
		24.9195	59.3808	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 10:54:08
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A02.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



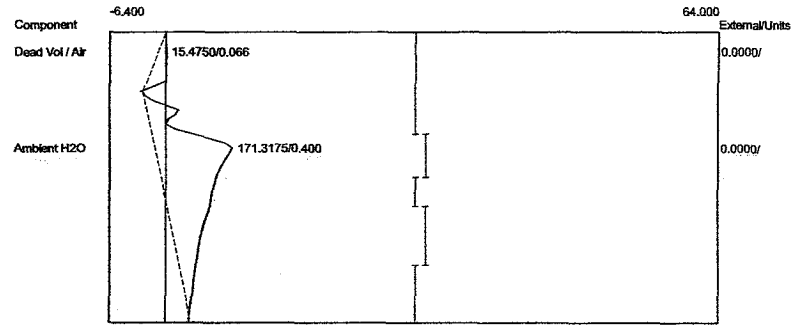
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	19.3110	0.0000	
Ambient H2O	0.400	174.4040	0.0000	
		193.7150	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 10:59:17
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A03.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



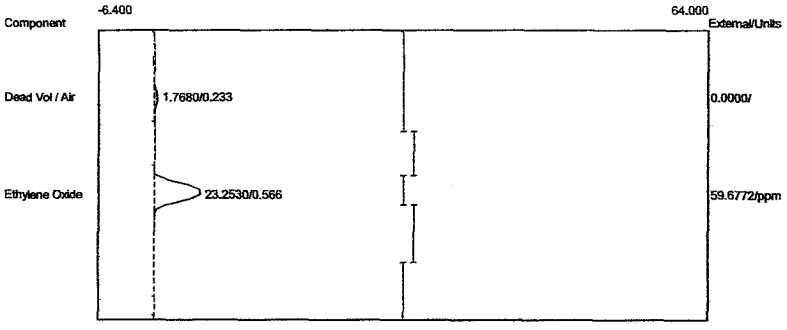
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7670	0.0000	
Ethylene Oxide	0.550	23.1975	59.5348	ppm
		24.9645	59.5348	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 10:59:17
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A03.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



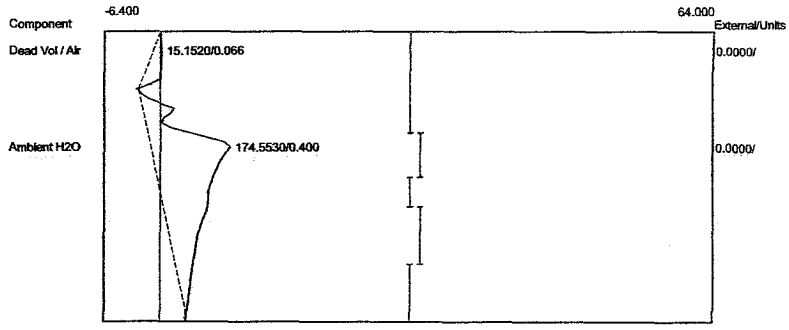
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	15.4750	0.0000	
Ambient H2O	0.400	171.3175	0.0000	
		186.7925	0.0000	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:04:08
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A04.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



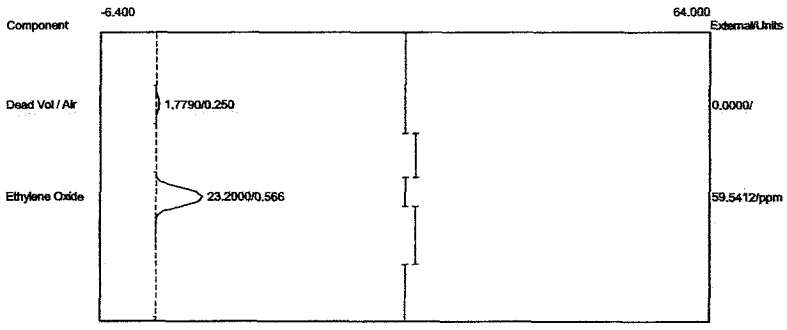
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7680	0.0000	
Ethylene Oxide	0.566	23.2530	59.6772	ppm
		25.0210	59.6772	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:04:08
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A04.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



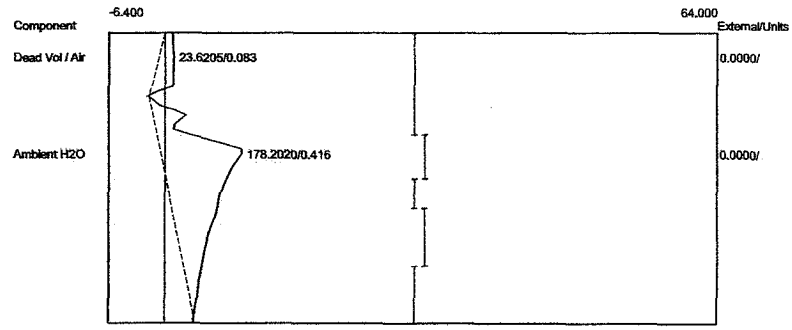
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	15.1520	0.0000	
Ambient H2O	0.400	174.5530	0.0000	
		189.7050	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:09:20
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A05.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



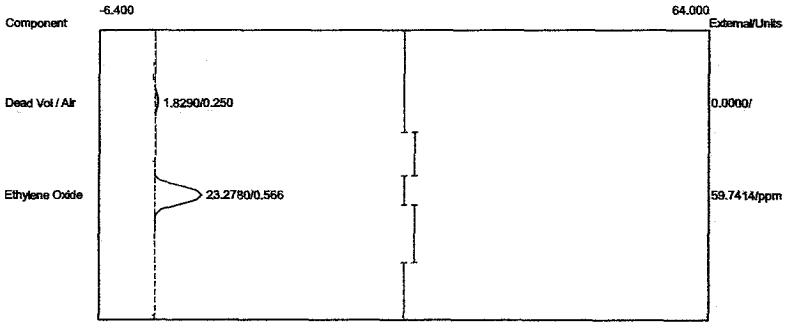
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7790	0.0000	
Ethylene Oxide	0.566	23.2000	59.5412	ppm
		24.9790	59.5412	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:09:20
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A05.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



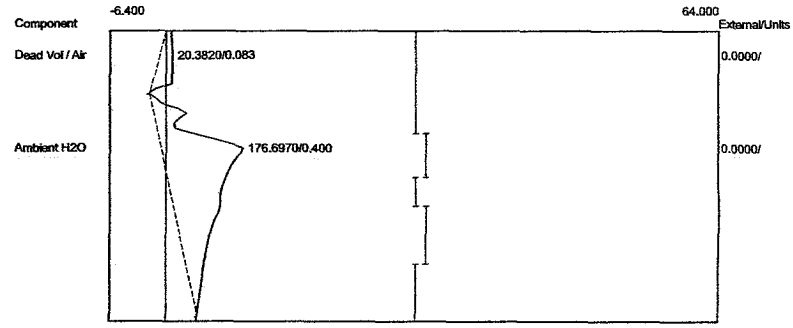
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	23.6205	0.0000	
Ambient H2O	0.416	178.2020	0.0000	
		201.8225	0.0000	

Lab Name: ESC
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:14:12
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A06.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



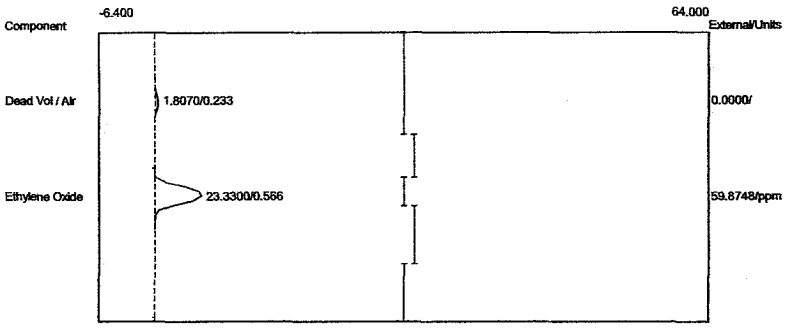
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.8290	0.0000	
Ethylene Oxide	0.566	23.2780	59.7414	ppm
		25.1070	59.7414	

Lab Name: ESC
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:14:12
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A06.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



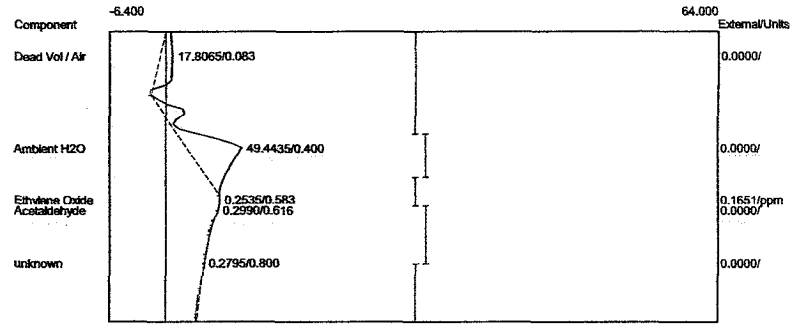
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	20.3820	0.0000	
Ambient H2O	0.400	176.6970	0.0000	
		197.0790	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:19:04
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A07.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



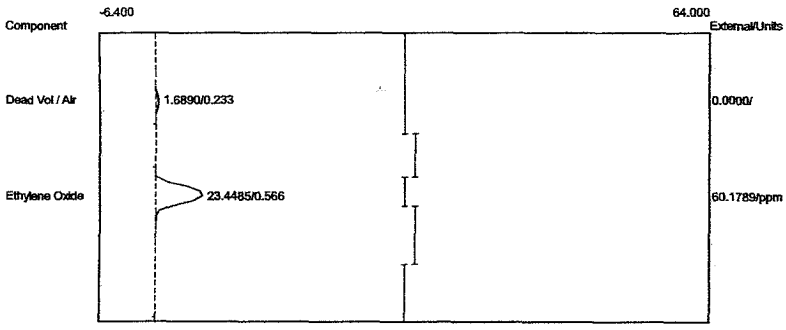
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.8070	0.0000	
Ethylene Oxide	0.566	23.3300	59.8748	ppm
		25.1370	59.8748	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:19:04
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A07.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



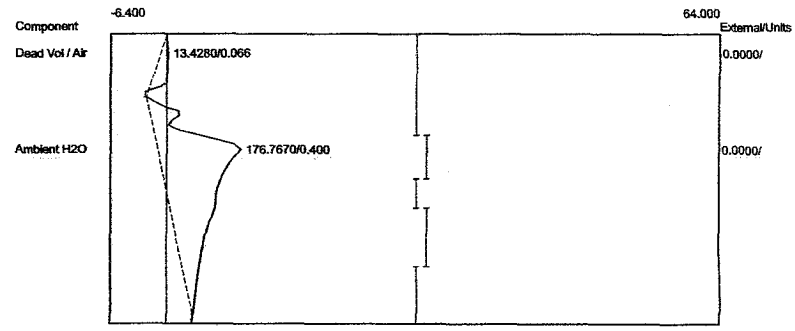
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	17.8065	0.0000	
Ambient H2O	0.400	49.4435	0.0000	
Ethylene Oxide	0.583	0.2535	0.1651	ppm
Acetaldehyde	0.616	0.2990	0.0000	
		67.8025	0.1651	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:24:06
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A08.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



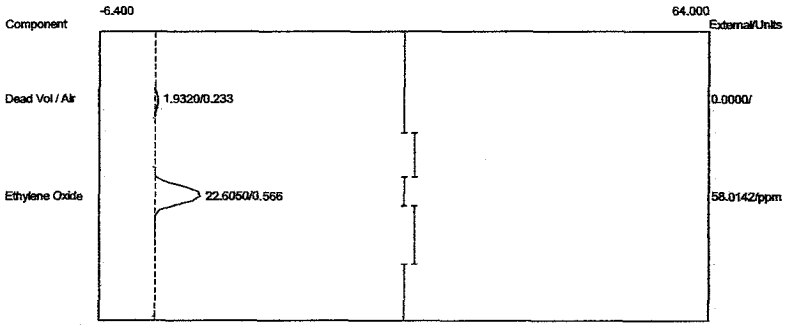
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.6890	0.0000	
Ethylene Oxide	0.566	23.4485	60.1789	ppm
		25.1375	60.1789	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:24:06
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A08.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



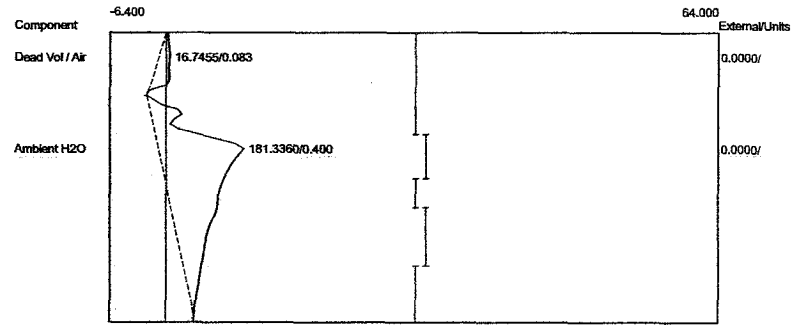
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	13.4280	0.0000	
Ambient H2O	0.400	176.7670	0.0000	
		190.1950	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:29:12
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A09.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



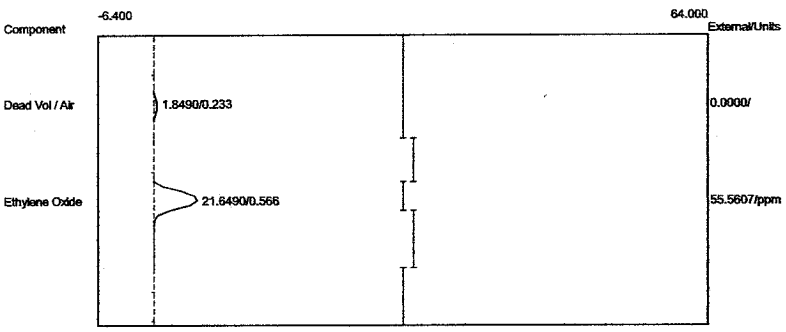
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.9320	0.0000	
Ethylene Oxide	0.566	22.6050	58.0142	ppm
		24.5370	58.0142	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:29:12
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A09.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



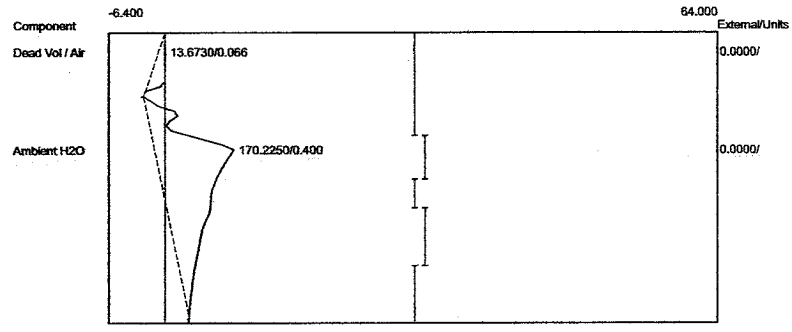
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	16.7455	0.0000	
Ambient H2O	0.400	181.3360	0.0000	
		198.0815	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:34:38
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A10.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



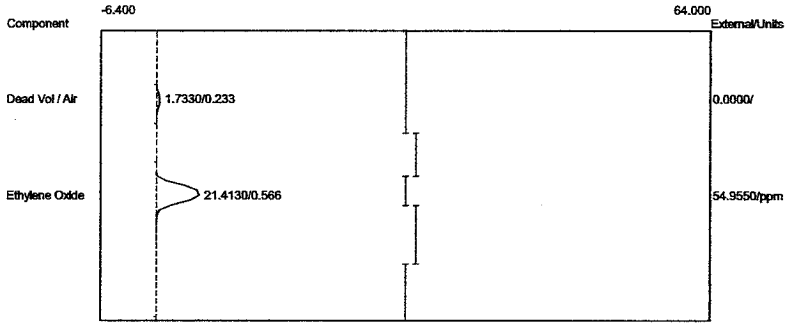
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.8490	0.0000	
Ethylene Oxide	0.566	21.6490	55.5607	ppm
		23.4980	55.5607	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:34:38
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A10.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



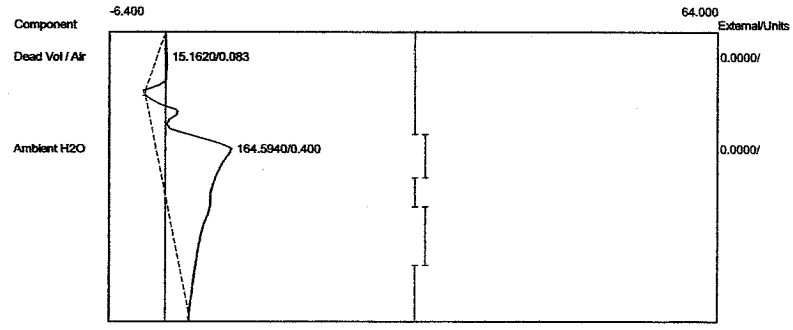
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	13.6730	0.0000	
Ambient H2O	0.400	170.2250	0.0000	
		183.8980	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:39:39
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A11.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



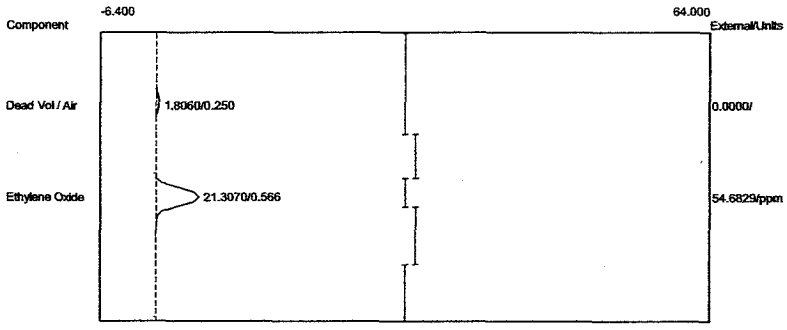
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7330	0.0000	
Ethylene Oxide	0.566	21.4130	54.9550	ppm
		23.1460	54.9550	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:39:39
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A11.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



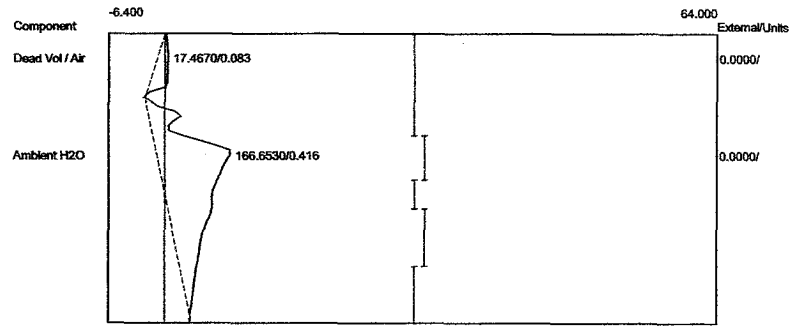
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	15.1620	0.0000	
Ambient H2O	0.400	164.5940	0.0000	
		179.7560	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:44:03
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-2A12.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.8060	0.0000	
Ethylene Oxide	0.566	21.3070	54.6829	ppm
		23.1130	54.6829	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#2
Analysis date: 11/15/2016 11:44:03
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-2A12.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer

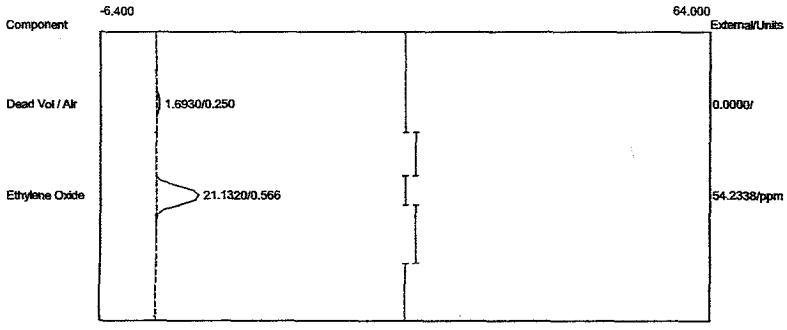


Component	Retention	Area	External	Units
Dead Vol / Air	0.083	17.4670	0.0000	
Ambient H2O	0.416	166.6530	0.0000	
		184.1200	0.0000	

APPENDIX E

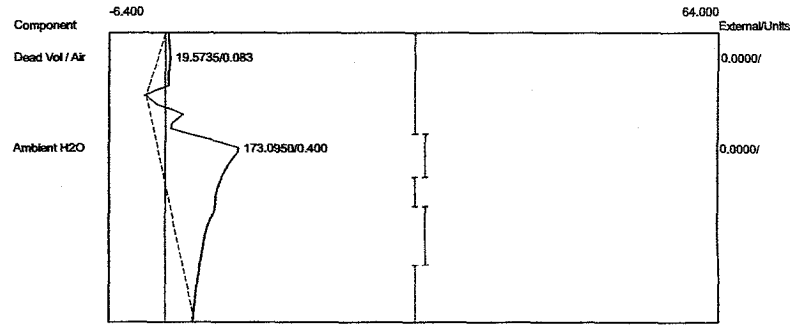
Run #3 Chromatograms – Aeration

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 11:49:15
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A01.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



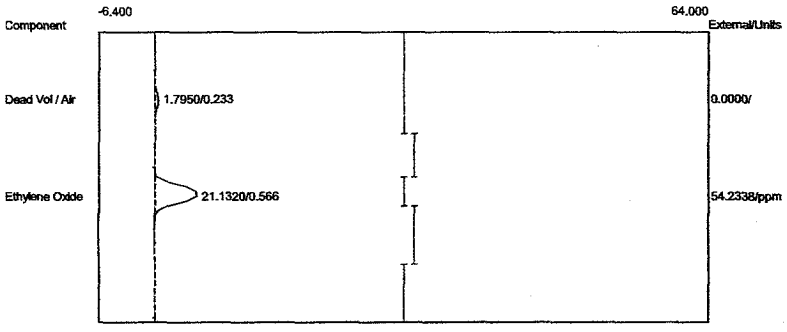
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.6930	0.0000	
Ethylene Oxide	0.566	21.1320	54.2338	ppm
		22.8250	54.2338	

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 11:49:15
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A01.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



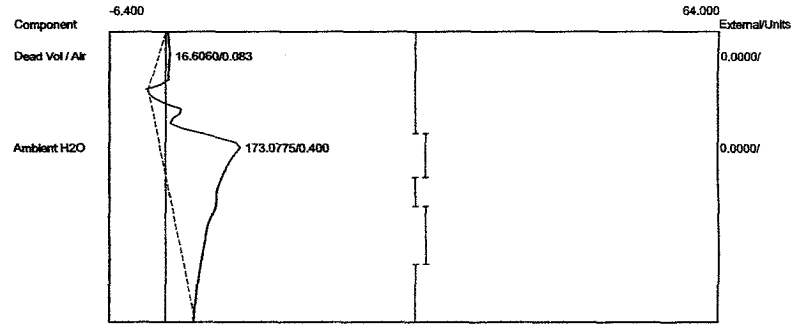
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	19.5735	0.0000	
Ambient H2O	0.400	173.0950	0.0000	
		192.6685	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 11:54:06
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A02.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



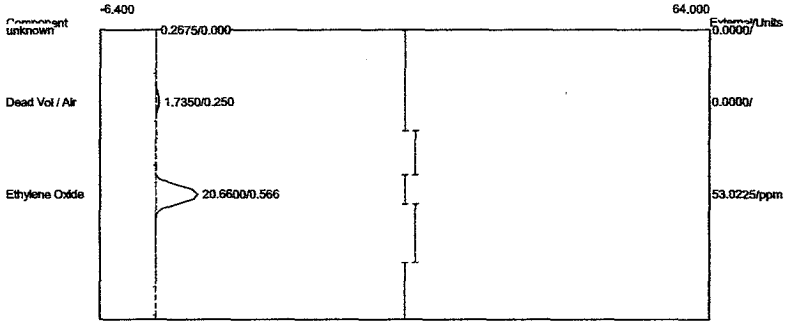
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7950	0.0000	
Ethylene Oxide	0.566	21.1320	54.2338	ppm
		22.9270	54.2338	

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 11:54:06
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A02.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



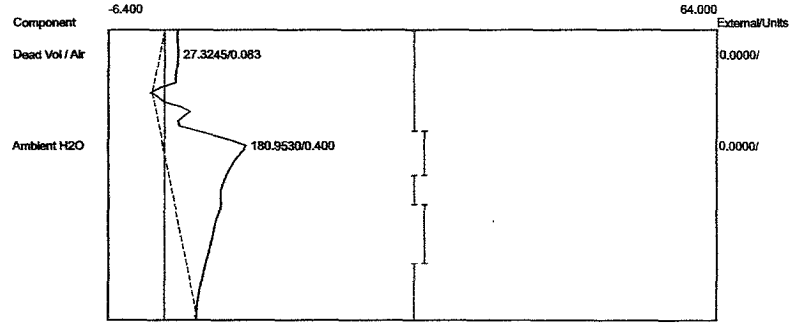
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	16.6060	0.0000	
Ambient H2O	0.400	173.0775	0.0000	
		189.6835	0.0000	

Lab Name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 11:59:04
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A03.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



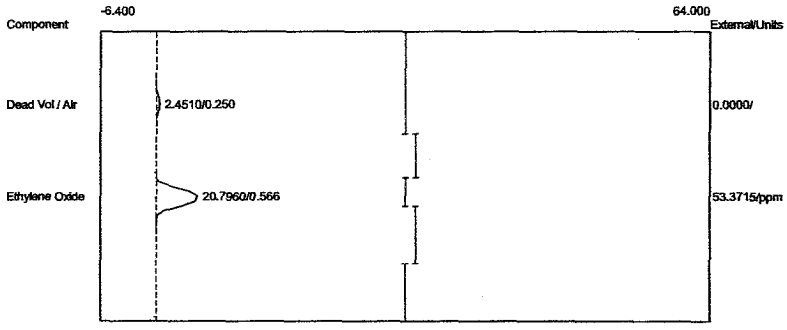
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7350	0.0000	
Ethylene Oxide	0.566	20.6600	53.0225	ppm
		22.3950	53.0225	

Lab Name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 11:59:04
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A03.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



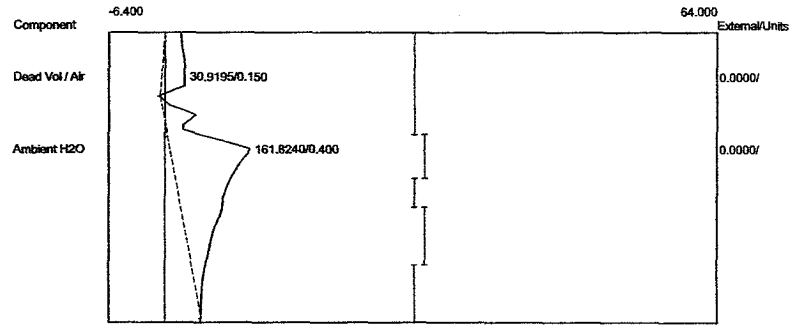
Component	Retention	Area	External	Units
Dead Vol / Air	0.083	27.3245	0.0000	
Ambient H2O	0.400	180.9530	0.0000	
		208.2775	0.0000	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:04:43
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A04.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



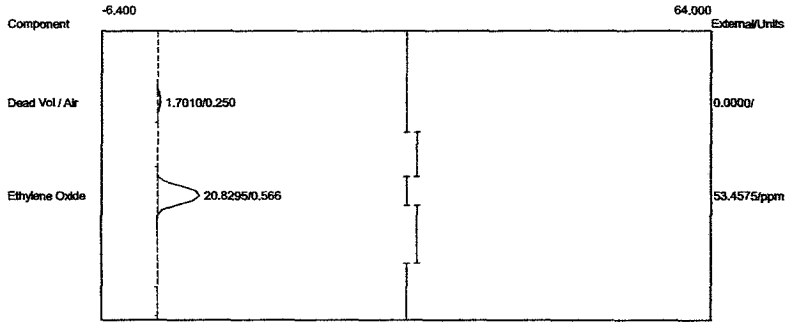
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.4510	0.0000	
Ethylene Oxide	0.566	20.7960	53.3715	ppm
		23.2470	53.3715	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:04:43
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A04.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



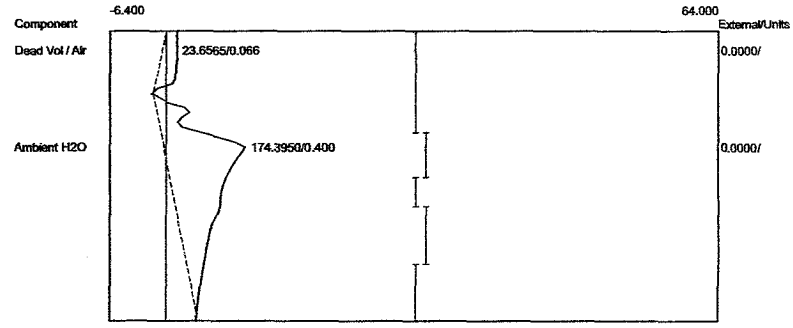
Component	Retention	Area	External	Units
Dead Vol / Air	0.150	30.9195	0.0000	
Ambient H2O	0.400	161.8240	0.0000	
		192.7435	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:09:29
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A05.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



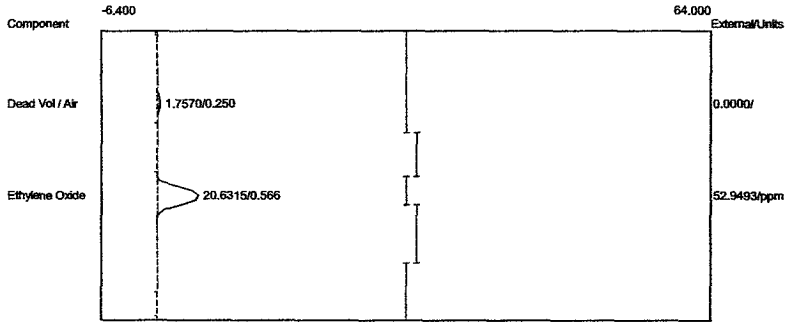
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7010	0.0000	
Ethylene Oxide	0.566	20.8295	53.4575	ppm
		22.5305	53.4575	

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:09:29
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A05.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



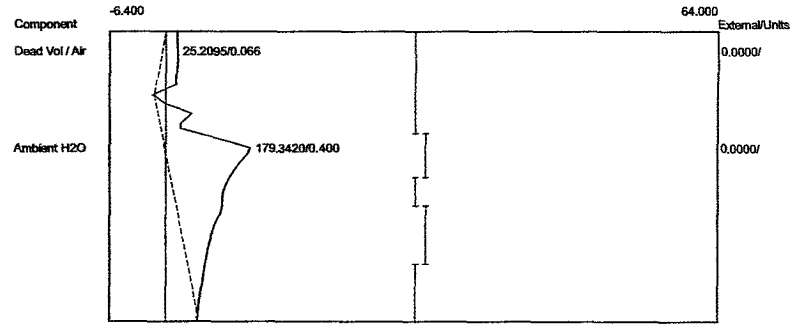
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	23.6565	0.0000	
Ambient H2O	0.400	174.3950	0.0000	
		198.0515	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:14:14
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A06.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



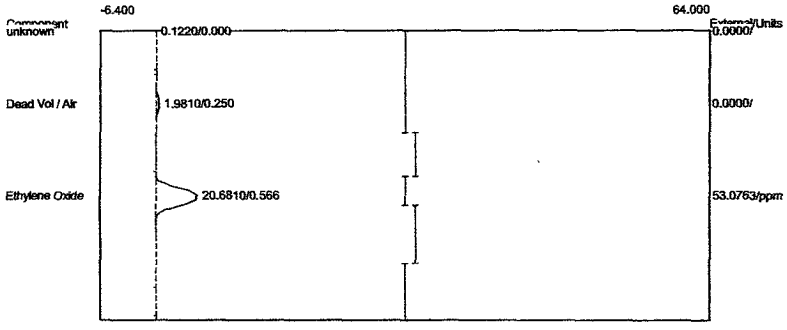
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7570	0.0000	
Ethylene Oxide	0.566	20.6315	52.9493	ppm
		22.3885	52.9493	

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:14:14
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A06.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



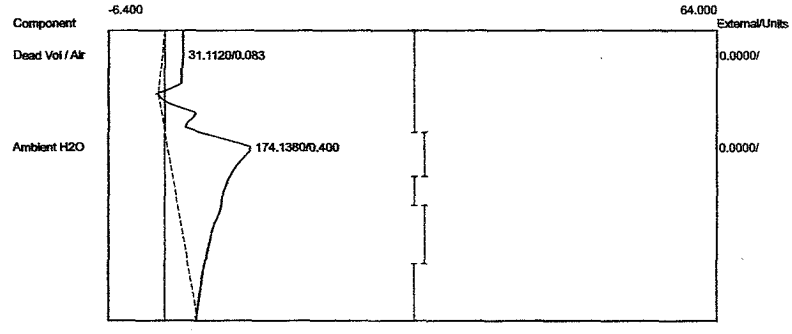
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	25.2095	0.0000	
Ambient H2O	0.400	179.3420	0.0000	
		204.5515	0.0000	

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:19:15
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A07.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.9810	0.0000	
Ethylene Oxide	0.566	20.6810	53.0763	ppm
		22.6620	53.0763	

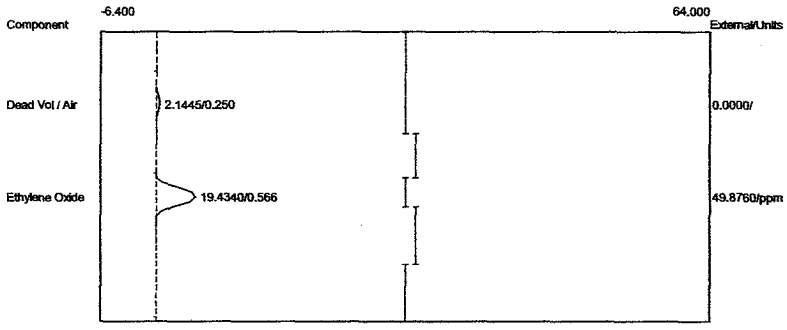
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:19:15
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A07.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.083	31.1120	0.0000	
Ambient H2O	0.400	174.1380	0.0000	
		205.2500	0.0000	

Lab Name: ESC

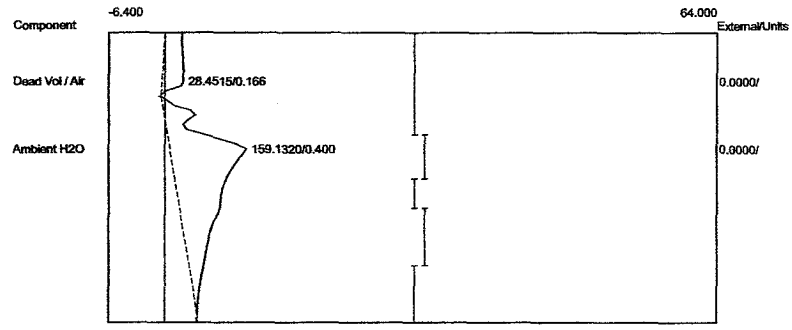
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:24:13
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A08.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.250	2.1445	0.0000	
Ethylene Oxide	0.566	19.4340	49.8760	ppm
		21.5785	49.8760	

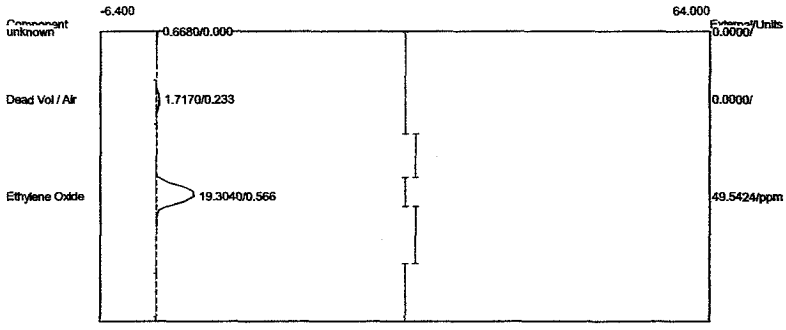
Lab Name: ESC

Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:24:13
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A08.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



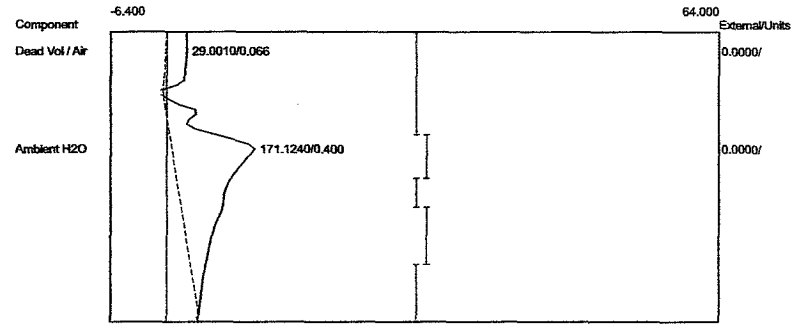
Component	Retention	Area	External	Units
Dead Vol / Air	0.166	28.4515	0.0000	
Ambient H2O	0.400	159.1320	0.0000	
		187.5835	0.0000	

Lab Name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:29:14
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A09.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



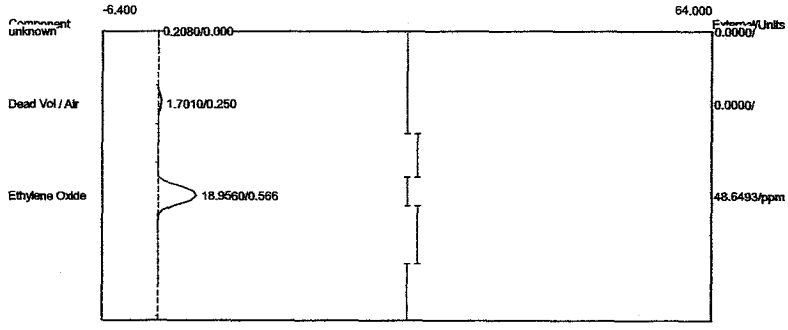
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7170	0.0000	
Ethylene Oxide	0.566	19.3040	49.5424	ppm
		21.0210	49.5424	

Lab Name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:29:14
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A09.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



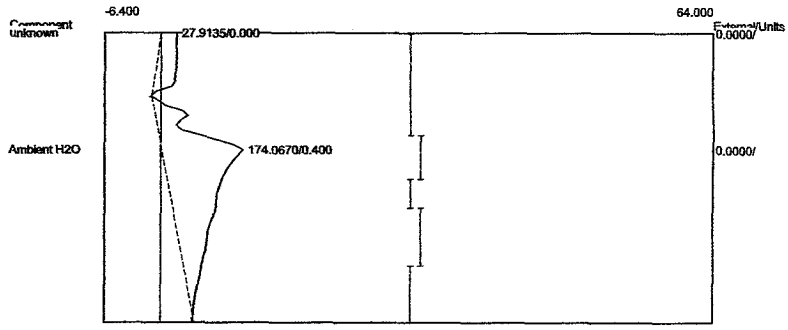
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	29.0010	0.0000	
Ambient H2O	0.400	171.1240	0.0000	
		200.1250	0.0000	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:34:09
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A10.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



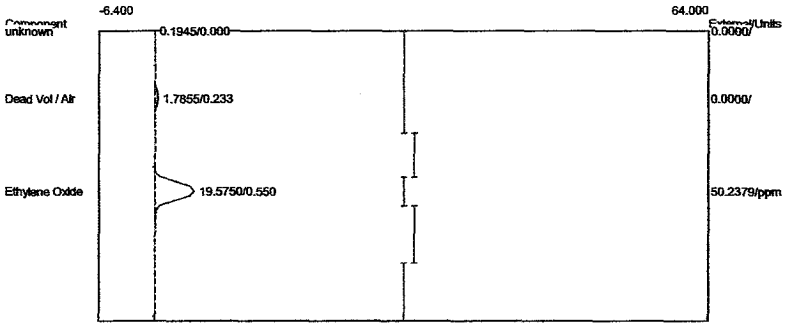
Component	Retention	Area	External	Units
Dead Vol / Air	0.250	1.7010	0.0000	
Ethylene Oxide	0.566	18.9560	48.6493	ppm
		20.6570	48.6493	

Lab name: EOSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:34:09
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A10.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



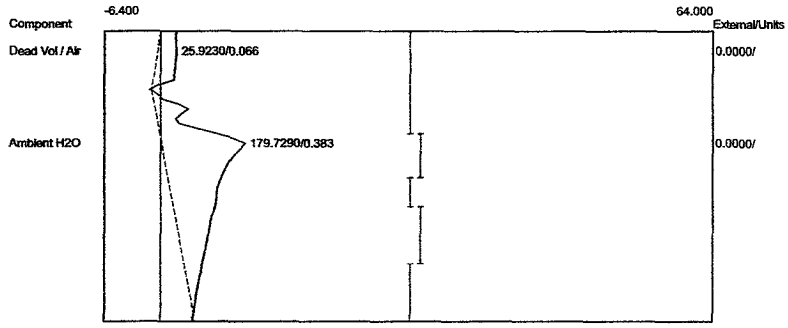
Component	Retention	Area	External	Units
Ambient H2O	0.400	174.0670	0.0000	
		174.0670	0.0000	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:39:03
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A11.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



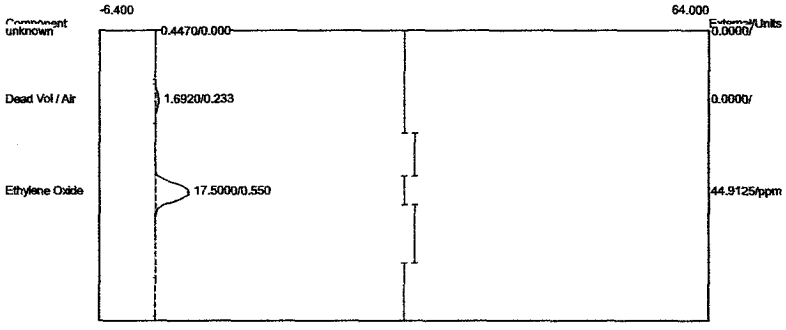
Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.7855	0.0000	
Ethylene Oxide	0.550	19.5750	50.2379	ppm
		21.3605	50.2379	

Lab name: ECSI
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:39:03
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A11.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



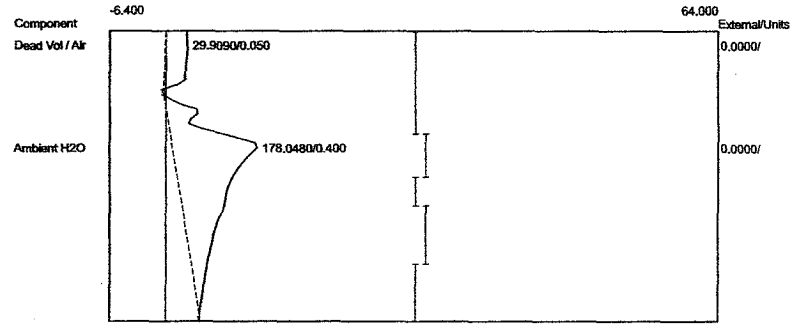
Component	Retention	Area	External	Units
Dead Vol / Air	0.066	25.9230	0.0000	
Ambient H2O	0.383	179.7290	0.0000	
		205.6520	0.0000	

Lab Name: ESC
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:44:01
Method: Direct Injection
Description: CHANNEL 1 - FID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto1-100.cpt
Data file: 1SterST2016-3A12.CHR (c:\peak359)
Sample: Abator Inlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.233	1.6920	0.0000	
Ethylene Oxide	0.550	17.5000	44.9125	ppm
		19.1920	44.9125	

Lab Name: ESC
Client: Sterigenics - Santa Teresa
Client ID: Aer#3
Analysis date: 11/15/2016 12:44:01
Method: Direct Injection
Description: CHANNEL 2 - PID
Column: 1% SP-1000, Carbopack B
Carrier: HELIUM
Temp. prog: eto-100.tem
Components: eto2-100.cpt
Data file: 2SterST2016-3A12.CHR (c:\peak359)
Sample: Abator Outlet
Operator: D. Kremer



Component	Retention	Area	External	Units
Dead Vol / Air	0.050	29.9090	0.0000	
Ambient H2O	0.400	178.0480	0.0000	
		207.9570	0.0000	

APPENDIX F

Field Data and Calculation Worksheets

ETHYLENE OXIDE SOURCE TEST/CALIBRATION DATA

Client: Steriqenics-Santa Teresa

Source Tested: Donaldson EtO Abator Date: 11/15/16

PRE CALIBRATION

	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO	1000 ppm EtO	10080 ppm EtO			
Inlet (FID)	Area Counts #1	.43	4.04	39.0					
	Area Counts #2	.42	3.97	37.2					
	Average Area	.43	4.01	38.1					
	Audit Standard (48.8 ppmv) Result					48.7 ✓		48.1 ✓	
Outlet (PID)	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO					
	Area Counts #1	1.71	15.2	147					
	Area Counts #2	1.75	15.9	151					
	Average Area	1.73	15.6	149					
	Audit Standard (48.8 ppmv) Result					49.3 ✓		48.3 ✓	

	Run #1	Run #2	Run #3				
Backvent start/stop:	0933 / 0948			P_{bar}:	–	EtO Usage (lbs/yr):	–
Aeration start/stop:	0948 / 1048	1048 / 1148	1148 / 1248	%H_2O:	–	Cycles Per Week:	–

POST CALIBRATION

	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO	1000 ppm EtO	10080 ppm EtO			
Inlet (FID)	Area Counts #1								
	Area Counts #2								
	Average Area		✓						
	Audit Standard (48.8 ppmv) Result					48.5 ✓			
Outlet (PID)	Calibration Gas Conc. (ppmv)	1.10 ppm EtO	10.1 ppm EtO	100 ppm EtO					
	Area Counts #1								
	Area Counts #2								
	Average Area								
	Audit Standard (48.8 ppmv) Result					49.4 ✓			

ECSi

APPENDIX G

Gas Certifications

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

600 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-001
Item No.: 0202000131OTCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CAL4448
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	1.10	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: MT DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)	Certified Concentration (Moles)	Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	1. PPM	1.10 PPM	10.0	5.00
NITROGEN	BAL	BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1300 PSIG
Expiration Date: 18Apr2018

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

00 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-003
Item No.: 02020001320TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CLM003232
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	10.1	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: MT MT DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)	Certified Concentration (Moles)	Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	10. PPM	10.1 PPM	1.0	5.00
NITROGEN	BAL	BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1400 PSIG
Expiration Date: 18Apr2018

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases
500 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-004
Item No.: 02020001330TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CLM011385
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	100.	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: B. McCully BLM DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	100.	PPM	100.	PPM	.0	5.00
NITROGEN		BAL		BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1400 PSIG
Expiration Date: 18Apr2018

Valve Connection: CGA 350

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

500 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-005
Item No.: 020200013 40TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CLM002810
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	1,000.	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: B. McCall BLM DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	1,000.	PPM	1,000.	PPM	.0	5.00
NITROGEN		BAL		BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 1300 PSIG
Expiration Date: 18Apr2018

Valve Connection: CGA 350

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFIED WORKING CLASS

Single-Certified Calibration Standard

Scott Specialty Gases

00 CAJON BLVD., SAN BERNARDINO, CA 92411 Phone: 909-887-2571 Fax: 909-887-0549

CERTIFICATE OF ACCURACY: Certified Working Class Calibration Standard

Product Information
Project No.: 02-57164-006
Item No.: 02020001340TCL
P.O. No.: VBL – D. KREMER

Cylinder Number: CLM005787
Cylinder Size: CL
Certification Date: 18Apr2016

Customer

ECSI, INC
PO BOX 848
SAN CLEMENTE, CA 92672

CERTIFIED CONCENTRATION

Component Name	Concentration (Moles)		Accuracy (+/-%)
ETHYLENE OXIDE	10,080.	PPM	5
NITROGEN		BALANCE	

TRACEABILITY

Traceable To

Scott Reference Standard

APPROVED BY: B. McCully BLM DATE: 4-18-16

SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
ETHYLENE OXIDE	10,000.	PPM	10,080.	PPM	.8	5.00
NITROGEN		BAL		BAL		

TRACEABILITY

Traceable To
Scott Reference Standard

PHYSICAL PROPERTIES

Cylinder Size: CL

Pressure: 800 PSIG
Expiration Date: 18Apr2018

Valve Connection: CGA 350

SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

COMMENTS

CERTIFICATE OF ANALYSIS

Customer Name:	ECSi, Inc.	**Cylinder Number:**	SA25925
Stock or Analyzer Tag Number:	N/A	**Product Class:**	Certified Standard
Customer Reference:	Verbal- Dan	**Cylinder - Contents[1]:**	28 CF @ 2000 PSI
MESA Reference:	104448	**Cylinder-CGA:**	A006-HP-BR/350
Date of Certification:	4/20/2016	**Analysis Method:**	GC-TCD/FID
Recommended Shelf Life:	2 Years	**Preparation Method:**	Gravimetric

Component	Requested Concentration[2]	Reported Concentration[2,3]
Ethylene Oxide	50 ppm	48.8 ppm
Nitrogen	Balance	Balance

Authorized Signature:

1. The fill pressure shown on the COA is as originally quoted. The fill pressure measured by the customer may differ from the fill pressure originally quoted due to temperature effects, compressibility of the individual components when blended together in the cylinder, gauge accuracy or reduction in content volume before shipping as a result of samples withdrawn for laboratory QC necessary to ensure product quality.
2. Unless otherwise stated, concentrations are given in molar units.
3. Vapor pressure mixes are blended at a sufficiently low pressure so as to eliminate phase separation under most low temperature conditions encountered during transport or storage. However, it is generally recommended that cylinders containing vapor pressure restricted mixes be placed on the floor in a horizontal position and rolled back and forth to improve homogeneity of the gas phase mixture before being put into service.

Analytical Gas Standards are prepared and analyzed using combinations of NIST traceable weights, SRM's provided by NIST, or internal gas standards that have been verified for accuracy using procedures published by the US-EPA. Pure gases are analyzed and certified for purity using minor component Analytical Gas Standards prepared according to the methods specified above. Balances are calibrated to NIST test weights covered by NIST test number 822/256175/96. Reference Certification #'s: 163/W, 830/N and 3280. Calibration methods are in conformance with MIL-STD 45662A.

MESA Specialty Gases & Equipment
division of MESA International Technologies, Inc.
3619 Pendleton Avenue, Suite C ♦ Santa Ana, California 92704 ♦USA
TEL: 714-434-7102 ♦ FAX: 714-434-8006 ♦ E-mail: mail@mesagas.com
On-line Catalog at www.mesagas.com